

100/140 Cardfolder Service Manual

Contents

Section 1	Service Operations and Adjustments	Page
1.1.1	Preventative maintenance	1.2
1.1.2	Removal of covers.....	1.2
1.1.3	Service at 6 months/1 million inserts.....	1.3
1.2.1	Removal of cassette	1.4
1.2.2	Removal of fold plate 1	1.6
1.2.3	Conveyor belt replacement.....	1.8
1.2.4	Pressure arm adjustment.....	1.9
1.2.5	Fold plate adjustment.....	1.10
1.3	Cardfolder Setup	1.11
1.4	Recommended Spares	1.20
Section 2	Parts Identification	Page
2.1	Chassis LH (Operator)	2.3
2.2	Chassis RH (Drive).....	2.3
2.3	Chassis Assy	2.4
2.4	Outer Cassette Components	2.5
2.5	Inner Cassette Components	2.6
2.6	Pressure Arm Assy	2.7
2.7	Fold Plate 1 Components	2.8
2.8	Drive Components	2.9
2.9	Overguide Components	2.10
2.10	Conveyor Components.....	2.11
2.11	Fold Rollers	2.12
2.12	Idle Posts, Hinges, Drive Belts etc	2.13
2.13	Covers	2.14
2.14	List of Fasteners	2.15
2.15	CIM Interface Kit	2.16
Section 3	Electrical items & Wiring Diagrams	Page
3.1	List of Electrical Items	3.2
3.2	Feeder/Folder PCB Circuit (Part 1)	3.3
3.2	Feeder/Folder PCB Circuit (Part 2)	3.4
3.3	Cardfolder Interface PCB Circuit.....	3.5
3.4	Cardfolder Long Range Sensor PCB Circuit.....	3.5
3.5	Cardfolder Mk.2 Wiring Diagram	3.6
3.6	Cardfolder Mk.1 Wiring Diagram	3.7

cont

Section 4	Description of Operation	Page
4.1	General	4.2
4.2	Cardfolder Sub-Modules.....	4.2
4.2.1	Infeed - Description.....	4.2
4.2.2	Infeed - Operation.....	4.2
4.2.3	Fold 1 - Description	4.3
4.2.4	Fold 1 - Operation	4.3
4.2.5	Fold 2 - Description	4.3
4.2.6	Fold 2 - Operation	4.4

Section 1

Service operations and Adjustments

1.1 Preventative maintenance

- 1.1.1 Preventative maintenance checklist
- 1.1.2 Removal of covers
- 1.1.3 Service at 6 months or 1 million inserts

1.2 Service operations

- 1.2.1 Removal of cassette
- 1.2.2 Removal of fold plate 1
- 1.2.3 Conveyor belt replacement
- 1.2.4 Pressure arm adjustment
- 1.2.5 Fold plate adjustment

1.3 Cardfolder Setup

1.4 Recommended Spares

Section 1 Maintenance and Adjustments

CAUTION!

Prior to carrying out any maintenance procedures on the Cardfolder, the following safety precautions must be observed:

- **Switch the machine OFF and disconnect the mains cable from the power supply - do not remove any cover before doing this. *Failure to isolate the mains could result in death or injury!***
- **Before switching the machine back on after completion of maintenance work, ensure all external covers are in place and undamaged. Replace any covers that are damaged.**

PUT SAFETY FIRST!

Note: All items shown in this section relate only to the Cardfolder unit and are in addition to the 100/140 service schedule. See also the 100/140 Service Manual.

1.1 Preventative maintenance check-list

(When all items have been carried out, worksheet must be signed to confirm).

1.1.1 General

1. Ask how the machine has been working lately and use this information as a guide for checking the machine.
2. Ask if there has been a change of use e.g. high production runs or a change of material.
3. Check the operator adjustments of the machine and the material being processed.
4. Switch on machine and confirm that no errors appear on the display screen.
5. If necessary, generally instruct the operators again with regard to their specific problem area.
6. Enter the total forms count on the service sheet.
7. When all service or repair operations have been carried out, the machine must be left with all parts reassembled, leaving no risk of injury.

1.1.2 Removal of covers

Note: throughout this manual, references to LH and RH are viewed from behind the paper path, looking towards the insert head. LH is also sometimes referred to as operator side, and drive side for RH side.

Some or all of the following covers may require removal for maintenance operations. *Ensure all covers are undamaged. Check action of opening covers to confirm correct operation, and that safety microswitches function correctly. Check that all warning labels are legible. Exercise caution with moving parts and exposed electrical apparatus when covers are removed.*

1. **RH drive side cover:** Remove the screw at the upper corner inside the chassis face. Lower edge of the cover slots into the wiring skirt.
2. **Rear cover:** Remove both side covers first, then remove 2 x nuts on the inside of the chassis flange. Note the slotted sub-cover and underpanel are sandwiched between rear cover and chassis.
3. **Each wiring skirt:** Remove both side covers first, then on the upper edge remove 2 x screws at the rear and 1 x screw at the front.
4. **Top cover:** Remove 2 screws in each hinge securing the perspex cover to the hinge (do not remove the hinge from the chassis unless replacing).
5. **Underpanel:** Remove rear cover first, then slide underpanel out. When replacing, note that the locating tags at the front edge must be properly in place.

1.1.3 Service at 6 months or 1 million inserts

1. Implement the actions in section 1.1.1 'General'.
2. Remove all machine covers.
3. Vacuum clean to remove internal dust. Clean all covers.
4. Autocalibrate sensors, then check their settings (see 'Analogue/Digital Sensors' in Engineer mode in the 100/140 Service Manual), then clean all sensors and re-check calibration. If any fail, check wiring carefully, particularly where wires enter the connector housing. Replace if necessary. **Note:** sensors must be cleaned using **only** a non-flammable airduster, such as part no. E0070A.
5. Check infeed side guides are tightly secured, parallel and correctly adjusted (1.5mm clearance each side on a piece of representative paper).
6. Check that steel overguide tapes in the insert area are not damaged or distorted. Also check plastic guide tapes for damage. Ensure all tapes are correctly adjusted.
7. If any of the nylon gear trains run noisily, lubricate **sparingly** with grease.
8. **Sparingly** lubricate with grease the planetary gears on the RH side of the cassette and the sliding detent plungers on both sides of the cassette.
9. Clean all rubber rollers and the green conveyor belts using Rubber Roller Restorer (part no. E0483A). Inspect the conveyor belts over their full length and replace if either is split or damaged (see section 1.2.3).
10. Inspect drive belts on both sides for damage and replace if required. Check they are correctly tensioned – they should feel reasonably tight, but not over-tight.
11. Check that the cassette pressure arms (upper and lower) are correctly tensioned and that the nylon pads are undamaged. Clean the pads using a spirit-based cleaner.
12. Refit all covers and test run the machine.

Section 1.2 Service Operations

CAUTION! Prior to carrying out any service operation, observe the safety precautions in section 1.1, especially isolating from the mains power supply. Ensure the working area is clear and the machine is securely supported. Use only the correct tools for the job.

1.2.1 Removal of cassette

1. Remove both side covers as described in [section 1.1.2](#).
2. On the RH side, cut or remove all clips securing the clutch wiring cable and disconnect the cable from the PCB.
3. Remove the drive belt tensioner shown in Fig. 1 below. Remove also the nut on the end of the shaft and the 4 x screws securing the bracket. Slide the bracket off, noting the spacer inside the bearing. Remove the drive belt.

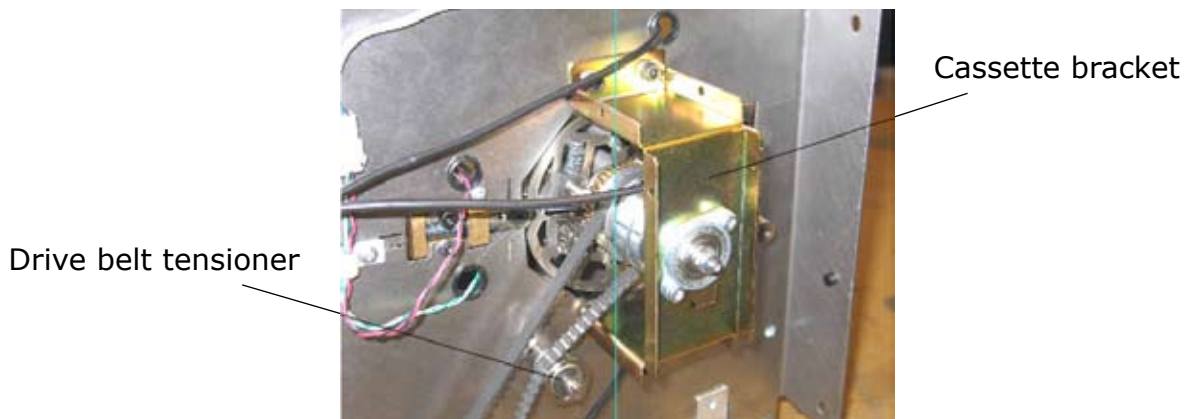


Fig. 1



Fig. 2 (showing cassette end after removal of bracket)

4. On the LH side, cut or remove all clips securing the brake wiring cable and disconnect the cable from the PCB.
5. Remove a drive belt tensioner to slacken the belt. Referring to Fig. 3 below, push the plastic rivets out of the 3 sensor PCBs and lift the PCBs away. Remove the nut on the end of the shaft and take off the timing discs with spacer and the inner nut/washers. Remove the 4 x screws securing the bracket and slide it off, complete with the brake.

Note:

disc with 2 slots
is outermost

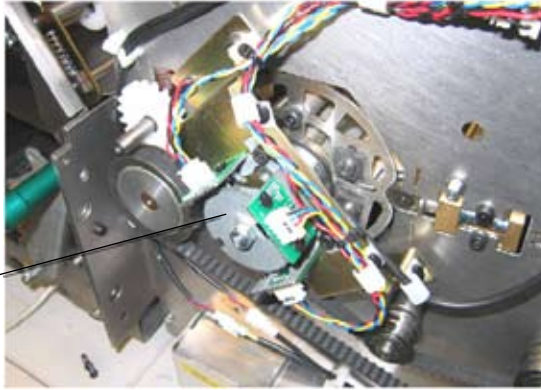
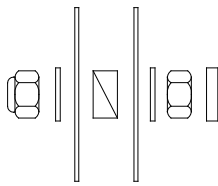


Fig. 3

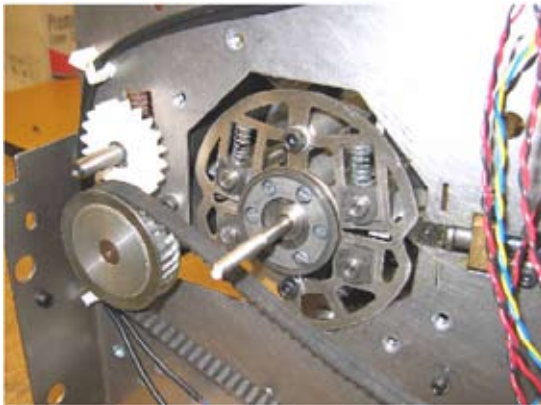


Fig. 4 (showing cassette
end after removal of
bracket)

6. With the cassette assembly now loose, manipulate it to slide the spring-loaded plungers out of the bronze blocks. Withdraw the cassette from the RH side (see Fig.5 below).



Fig. 5

7. Reassembly is a reversal of the above. Ensure that the timing disc arrangement is assembled as shown in Fig. 3.

1.2.2 Removal of fold plate 1

1. Remove both side covers as described in [section 1.1.2](#).
2. On the RH side, slacken the clutch locator screw and move it clear of the clutch lug. Disconnect the sensor cable and remove the clutch, drive belt and pulleys, complete with drive pins. Remove the flanged bearing/waved washer in the side plate. (See Fig. 6 below).



Sensor
connector

Fig. 6

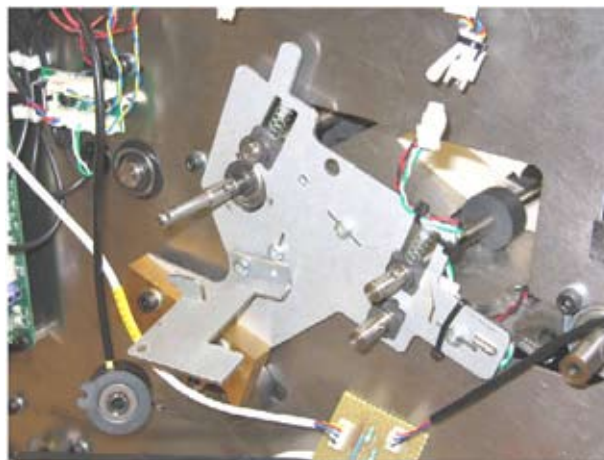


Fig. 7 (showing fold plate
after stripdown)

3. On the LH side, slacken the drive belt tensioner and remove the belt.
4. Referring to Fig. 8, slacken the clutch locator and move it clear of the clutch lug, then remove the clutch, gear and pulley.
5. Remove all 'T' bearings and springs in the side plate and remove the side plate (3 x screws). See Fig. 9.



Fig. 8 (showing fold plate before stripdown)



Fig. 9 (showing fold plate after removal)

6. From the RH side, withdraw fold plate 1 assembly, complete with the 3 roller shafts (see Fig. 10 below).



Fig. 10

7. Reassembly is a reversal of the above. Note the belt route, shown in Fig. 11 below.

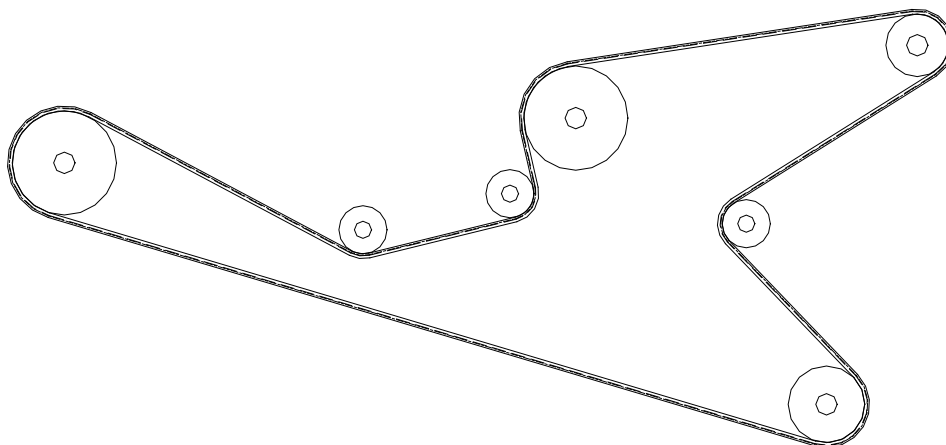


Fig. 11

1.2.3 Conveyor belt replacement

The green conveyor belts should be cleaned at service intervals (see [section 1.1.3](#)). If either is split, damaged or excessively worn, they must be replaced (as a pair only). This requires removal of the conveyor assembly, as described below:

1. Remove both side covers as described in [section 1.1.2](#).
2. Trace the conveyor sensor cables back to the PCB and disconnect. Cut any cable ties securing them.
3. On the RH side, remove the flanged bearing/waved washer on the lower shaft and the screw from the upper and support shafts (see Fig. 12 below).
4. On the LH side, remove the gear and the flanged bearing from the lower shaft and the screw from the upper and support shafts (note that the rear end of the conveyor is now free to drop).

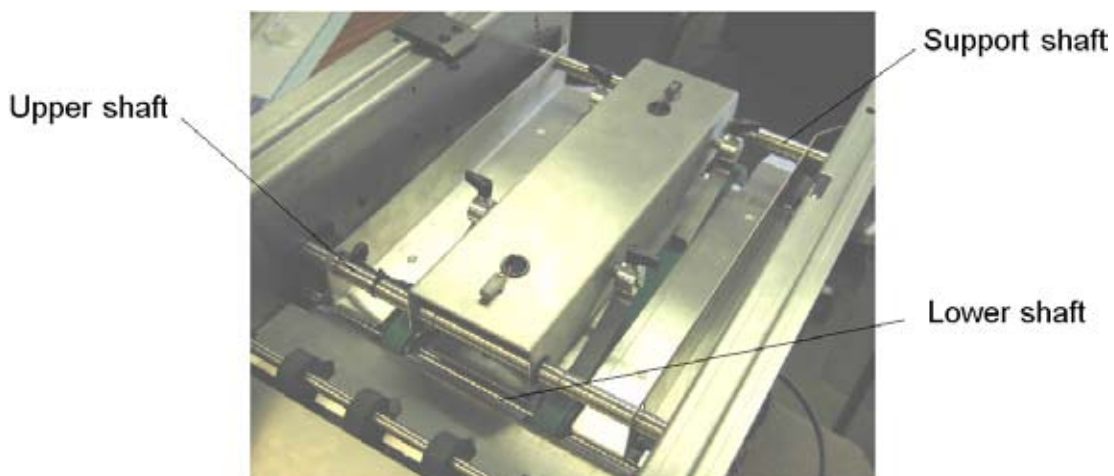


Fig. 12

5. Lift the conveyor assembly out of the chassis. Remove the upper shaft with overguide from the assembly.
6. Remove the 'T' bearings and springs on the rear tension shaft, and lift out the shaft. Depending on the width setting of the side guides, it should now be possible to slip the conveyor belts over the ends of the lower shaft. If the side guides are obstructing this, they must be removed.
7. Fit the new belts and reassemble in reverse order to removal. Reset the side guides (if necessary) to provide 1.5mm clearance each side on a piece of representative paper.

1.2.4 Pressure arm adjustment

The pressure arm controls the trailing part of the document as the cassette revolves. The nylon pressure pads should be inspected at service intervals (see [section 1.1.3](#)) and replaced if worn or damaged. The spring tension of the arm is set as described below:

1. The pressure arms should be adjusted so that the springs are in the approximate position shown in Fig. 13 below. This will provide reasonably firm contact between the nylon pad and the aluminium shoe.
2. To adjust, slacken the grub screws (1 in each collar) and twist the collars so that the springs are correctly tensioned. Tighten the grub screws.



Fig. 13

Grub screws

3. Test run the machine to ensure the trailing part of the document is being properly re-strained. Examine the document carefully to ensure the springs are not over-tensioned and causing marks on the paper.

1.2.5 Fold plate adjustment

The gap between the upper and lower plates on the oscillating fold plate must be correctly adjusted or operating faults will occur.

To adjust the gap

The gap must be set to the minimum possible to allow the card to pass through freely. To adjust, turn the screw at each end of the front edge of the plate (see Fig. 14 below). Each screw must be turned an equal amount and locked with thread-lock adhesive, such as Loctite 241 (red) or similar.

Note: Failure to use an adhesive will result in the screws vibrating loose.

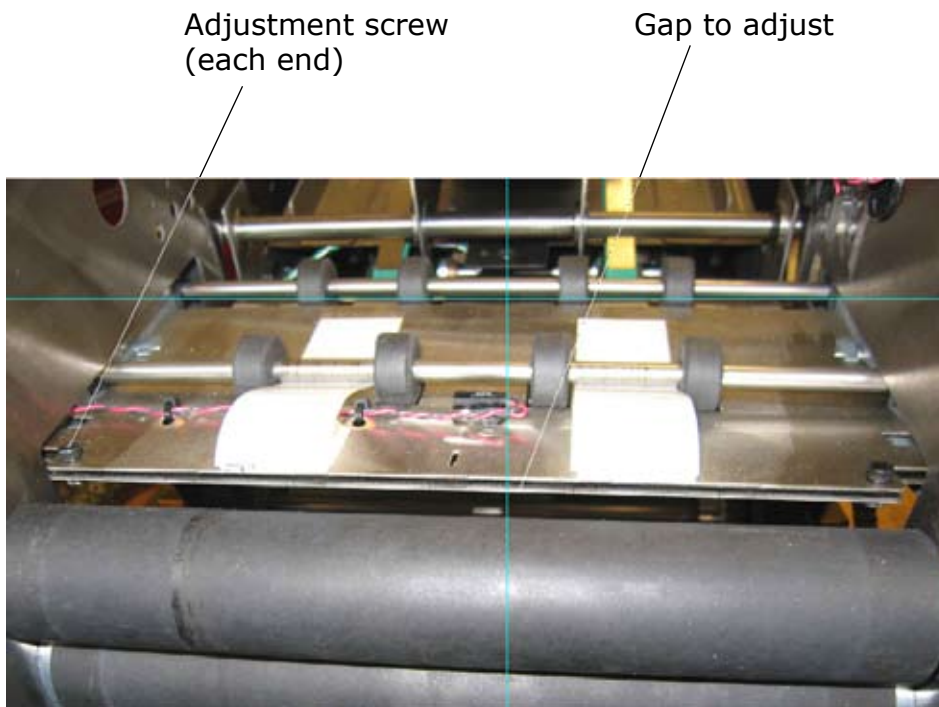


Fig. 14

NOTE: Early machines are fitted with 2 fold plates instead of a cassette. Both fold plates are adjusted as described above.

1.3 Cardfolder setup

This section provides assistance to field technicians to setup the Cardfolder module and also highlight corrective actions required to reduce form skew and fold variation.

Please ensure that the Cardfolder Lenze clutch retrofit kit (A0431A) has been fitted as per fitting instruction K4049A, and also ensure firmware version 4.1.0.0 (or later) has been installed to ensure consistent cassette detent positioning (also improves inconsistent folding in the Cassette).

Mechanical Setup – there are a number of mechanical adjustments required to setup the cardfolder module which is *always* carried out by End of Line testing. However, there may be some cases where fine-tuning may be required to ensure consistent feed and folding with certain supplies (paper and card positions).

These adjustments consist of the following:-

- 1.3.1** The infeed conveyor height on the cardfolder module can be adjusted to suit forms being fed from the card system. Adjustment is by slackening the screws located inside the Cardfolder back cover (B9113T). The lateral adjustment should also be made so that the form does catch either sideguide and enters the cardfolder cleanly. If adjusted incorrectly, this can lead to skew feeding/folding see Fig. 15 below.

Ensure form enters side guides centrally with adequate clearance
(see 1.3.2 on following page)



Fig. 15

- 1.3.2** The infeed conveyor side guides should be set parallel to the side plates - see Fig. 16 below. Adjustments can be carried out by placing a sheet of A4 (or Letter) in the conveyor and then adjusting the lock nuts underneath the conveyor bed to 1mm total clearance on either side. Note: if adjusted incorrectly, this can lead to skew feeding/folding.

In some cases the side guides will perform better if set slightly tapered - open at the entry with <1mm clearance (total) at the exit.

Note, access to the locknuts is from rear of module.

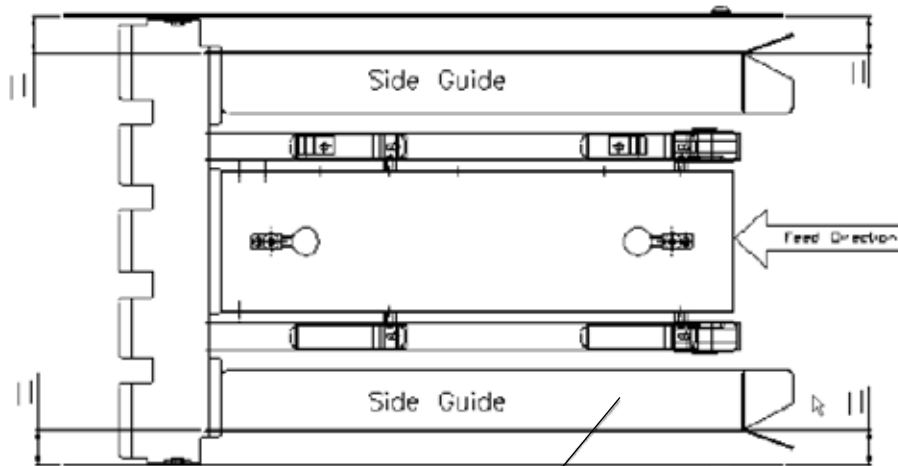


Fig. 16

Set side guides with
1mm clearance either
side

- 1.3.3** The forms are driven through the conveyor and controlled by the 4 guide springs that can be adjusted to increase or decrease the tension on the paper. If these are adjusted incorrectly, this may also lead to skew feeding/folding. Note: do not apply too much tension (drive) or it may cause jams in the conveyor.

The tension should be the same on all 4 guides. The guides are set just touching the bed and then locked in position without any additional tension applied (making sure whilst locking no additional tension is applied). Check for equal tension by pulling a strip of paper between the deck and guide as shown - see Figs. 17 & 18.

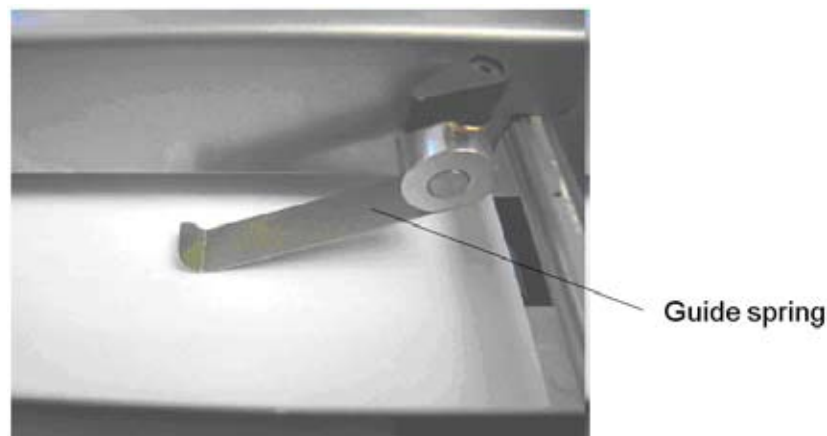


Fig. 17

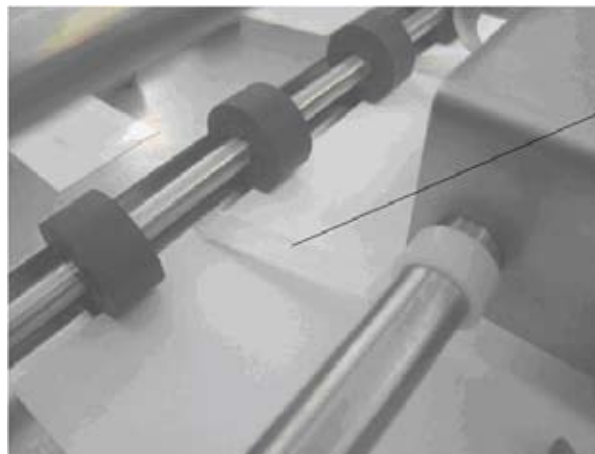
Tension on strip of paper must be equal for all 4 guides



Fig. 18

Ensure the form does not buckle in the conveyor whilst being held in the deskew rollers. If the form buckles near the deskew rollers then the tension must be reduced at the exit guides.

- 1.3.4** Adjust the tension of the 2-off cable ties 169-106 to provide guidance into the deskew rollers, as shown in Fig. 19. These guides control the form into the nip of the deskew rollers. Note: if too much force is applied it can increase skew/folding inaccuracy.



Adjust cable ties for guidance into deskew rollers

Fig. 19

- 1.3.5** Fold Plate Gap Adjustment – this is the gap between the upper and lower plates on the oscillating fold plate (FP1) and must be correctly adjusted or will cause skew and inconsistent folding. **Note that this gap has been already factory set and adjustment is not normally required- if this proves necessary, adjust as described below.**

To adjust the gap - set to the minimum possible to allow the card to pass through freely (2 card thickness). To adjust, turn the screw at each end of the front edge of the plate (see Fig. 20 overleaf). Each screw must be turned an equal amount and locked with thread-lock adhesive, eg. Loctite 241 (red) or similar.

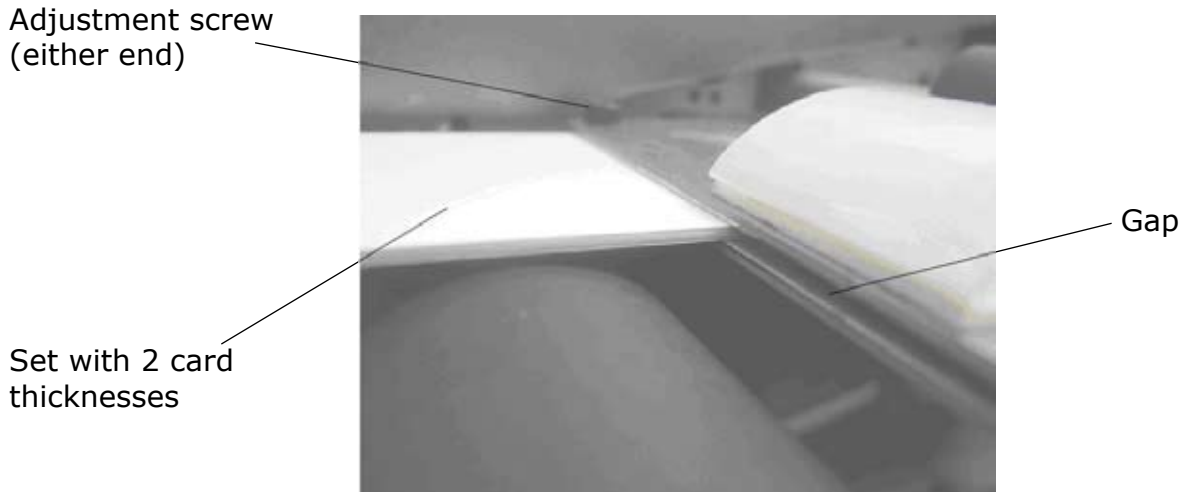


Fig. 20

1.3.6 Pressure arm adjustment (Fig. 21 below) – to reduce skew in the 2nd fold (cassette). Excessive block pressure restricts cassette rotation causing erratic stop position. This in turn produces inconsistent fold lengths

This adjustment is critical if experiencing skewed documents caused by the second fold (cassette). The pressure blocks maintain tension on the paper, keeping the form away from the fold roller during rotation.

For Top address Z fold, the cassette rotates Counterclockwise when viewed from the operator side.

- Upper pressure blocks are active.
- Nominal position shown.
- RH pressure arm collars in picture shown set to correct spring tension, ie. setscrew secured next to cable slot, (in spring slackening direction, not tightening).
- LH pressure arm tension is then adjusted equal to RH.
- If skew folding is experienced LH pressure arm tension is increased or decreased, until fold is acceptable.

For Bottom address Z fold, the cassette rotates clockwise when viewed from the operator side

- Lower pressure blocks are active (located underneath machine). Nominal position and adjustment as for upper pressure blocks.

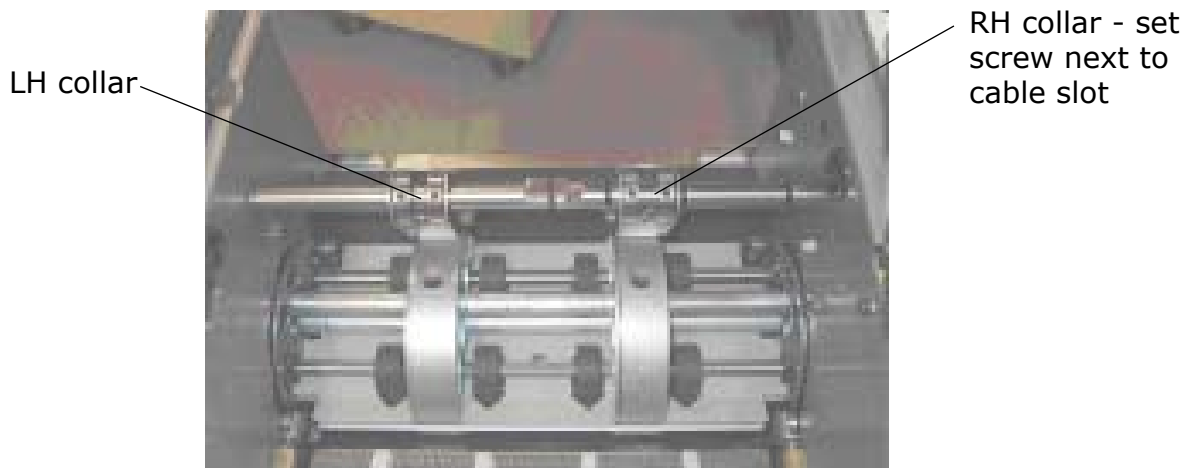


Fig. 21

Rotate cassette to check pressure
- if too heavy, this can cause inconsistent fold lengths.



If pressure is too heavy with top address Z fold, adjust upper blocks as shown

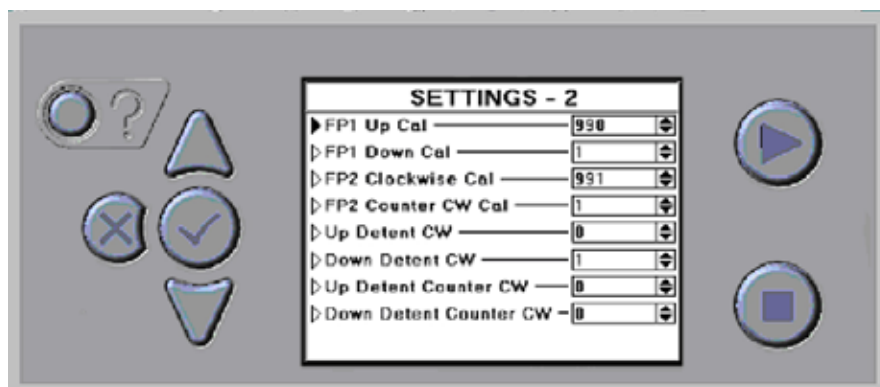
Fig. 22

1.3.7 Engineering Settings (Fig. 23)

a) Clarification of Fold Plate Setting and Calibrations – it is important to adjust the correct settings for folds. The table below highlights which fold plates are active when viewed from the operator side:-

Fold Type	Fold Plate 1 position (1st & 2nd settings)	Fold 2 (Cassette) rotation (3rd & 4th settings)
Z Top Address	UP	Counterclockwise
Z Bottom Address	DOWN	Clockwise
C Top Address	DOWN	Counterclockwise
V Top Address	DOWN	Not used

Engineering Settings (global for all jobs)



cont.

Fig. 23

b) Detent Position Setting – ensure the Lenze Clutch upgrade kit is fitted. This will ensure consistent cassette detent positioning (and improves inconsistent folding in the cassette).

Note, a job must be run to check the cassette rotates into detent positions.

- To calibrate for the **Up/down detents CW** – you must run a **bottom address Z**.
- To calibrate for the **Up/down detents Counter CW** – you must run either **C or Z Top Address**.

Definitions:

Cassette UP – no springs visible in cassette when looking from above. NB. The cassette folding cycle always starts from the 'UP' position.

Up detent CW – this adjusts the cassette position (in degrees rotation) when returning to the UP detent (**cassette rotating CW**) having ejected the folded document. For example, if the cassette is not entering (undershooting) – then **increase** the **Up detent position**.

Down detent CW – this adjusts the cassette position in the down detent when the cassette is rotating CW during the folded operation.

Up detent Counter CW – as above but Counter CW

Down detent Counter CW – as above but Counter CW

c) Engineering Drives (Fig. 24)

Drive clockwise and Drive anti-clockwise - these 2 clutches (which comprise the clutch upgrade kit) control the direction of the drive belt to the cassette. The clutches should not and cannot both be set to 'ON'.

Clutch cassette: Causes the cassette to rotate when 'ON'. The direction of rotation is determined by either 'Drive Clockwise' or Drive anti-clockwise' being 'ON'. Note that 'Brake cassette' needs to be 'OFF' during cassette rotation. Clutch cassette when 'OFF' causes the cassette feed rollers to turn. The direction is determined by 'Drive Clockwise' or 'Drive anti-clockwise'.

Brake cassette when 'ON' prevents the cassette from rotating (while the feed rollers are turning).

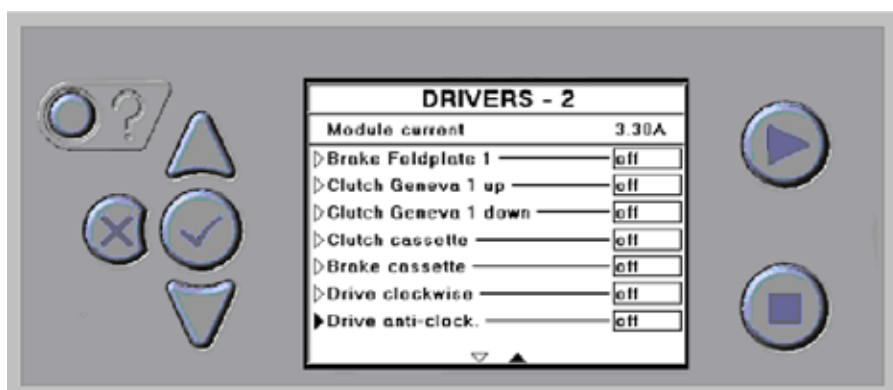


Fig. 24

1.3.8 Skew and Fold Specifications

Total Skew with folded document: 1.5mm Max (C or Z) and 2.5mm Max (V Fold).

Fold Variation: +/- 2.0mm on each fold.

Examples

Example 1: Running Z fold bottom address and experiencing skew in 1st Fold

Corrective actions required: 1.1, 1.2, 1.3, 1.4 and 1.5.

If problem still persists the deskew value can be increased to:

Medium = 250mS or

High = 400mS

Note the default is Low = 150mS

Example 2: Running Z fold bottom address and experiencing inconsistent fold lengths in 2nd fold (cassette).

Corrective actions required: initially check that the cassette clutch is engaging/ disengaging in the Engineer window.

Then rotate the cassette by hand to check the pressure applied from the pressures arms onto cassette (cassette should rotate with ease – light pressures from both upper / lower blocks).

Re-adjust if pressure is heavy (both upper / lower blocks) as per 1.3.6.

Once the pressure is adjusted – the detents and fold lengths will require re-calibration in the Engineer window (section 1.3.7).

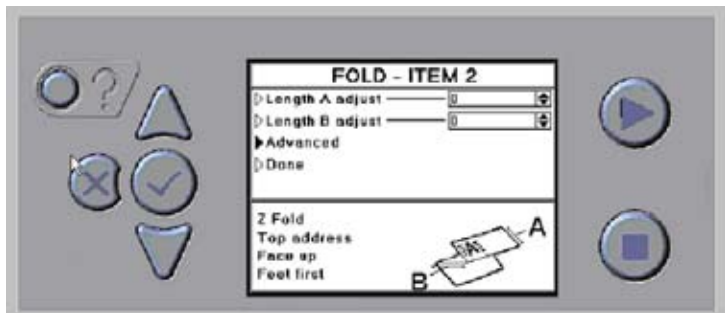
Example 3: Running Z fold Top address and experiencing skewed forms in 2nd fold (cassette) – skewed towards LH (Operator side).

Corrective actions required: 1.3.6 - the pressure on the LH side needs increasing until the skew is within specification (section 1.3.6).

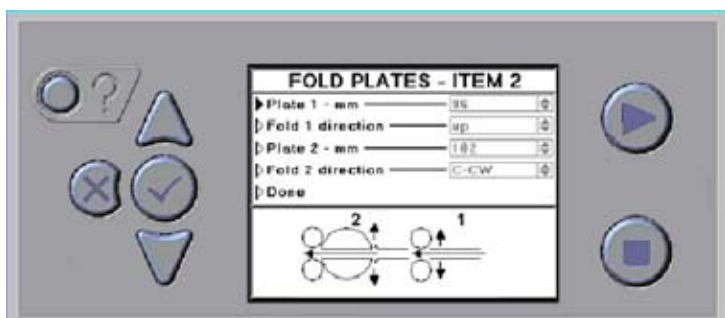
Appendix – fold types

To move the address position – this is normally carried out in the 'Address Adjust' within Calibration Cycle (+ve moves up and -ve moves down). To view these effects go into the Advanced fold window highlighted below.

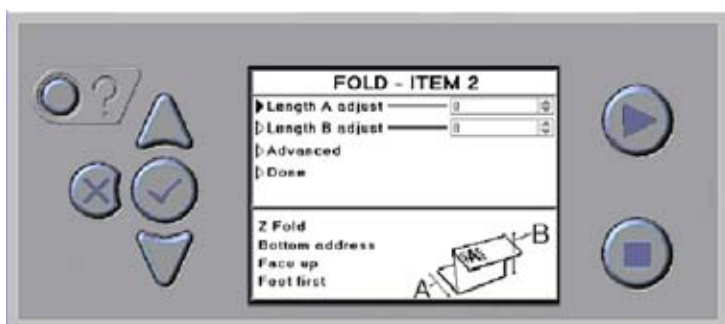
To increase/ decrease the fold lengths to suit fit into an envelope - change either in Custom Fold window or Advanced fold window, but not both.

Z – Fold Top Address

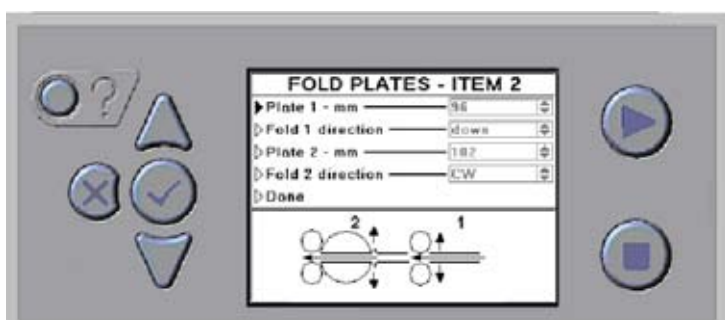
Custom Fold Window



Advanced Fold Window

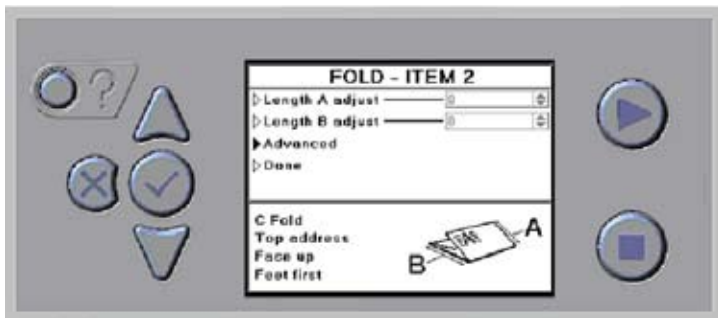
Z – Fold Bottom Address

Custom Fold Window

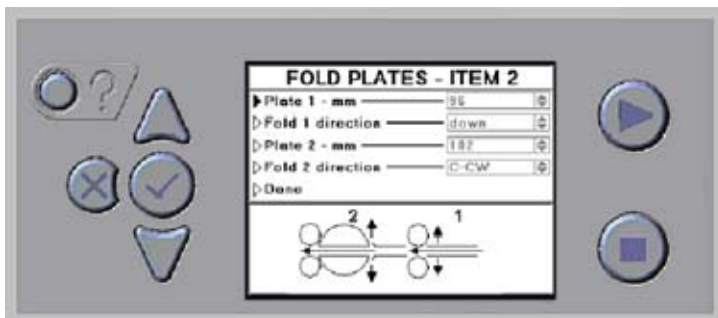


Advanced Fold Window

C – Fold Top Address

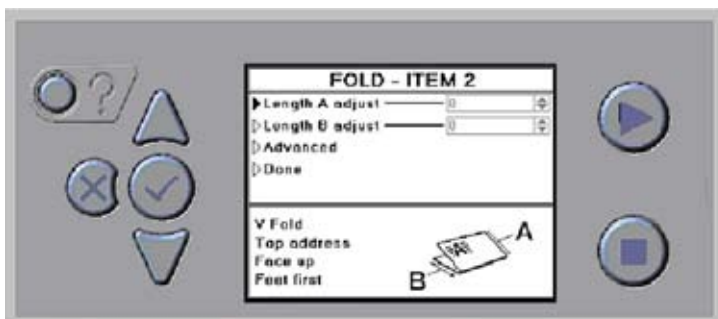


Custom Fold Window

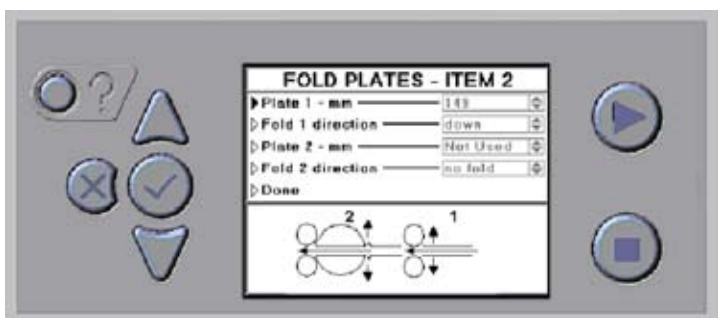


Advanced Fold Window

V – Fold Top Address



Custom Fold Window



Advanced Fold Window

1.4 Recommended Spares

The list below shows the spares recommended to be held by Service Agents. The quantities indicated are per 2 machines. The full set can be obtained by ordering A0442A (Mk. 2) or A0359A (Mk. 1)

A0442A (Cardfolder Mk. 2)

PART	DESCRIPTION	QTY
117-240	OPTO PAIR LONG RANGE	1
180-759	PCB SPLIT 5SEN 5SOL H/D	1
180-761	PCB SPLITTER 6TX H/D	1
180-762	PCB SPLITTER 6RX H/D	1
180-790	PCB LONG RANGE SENSOR	1
180-794	PCB ASSY PHOTOLOGIC DISK	2
181-117	CLUTCH W/D EC25CW XH 24V	2
181-127	CLUTCH W/D EC25CCW XH 24V	1
181-132	CLUTCH W/D 179-154 2WXH (LENZE)	1
181-147	CLUTCH W/D 179-159 SM (LENZE)	1
181-148	BRAKE W/D 179-108 2WXH (LENZE)	1
182-353	LOOM RX/TX 300 4WSM PLG	1
182-437	LOOM EMITTER 100 XH	1
182-438	LOOM RECEIVER W/A 100 XH	1
182-440	LOOM EMITTER 200 XH	1
182-442	LOOM RECEIVER N/A 200 XH	1
182-443	LOOM EMITTER 300 XH	1
182-445	LOOM RECEIVER N/A 300 XH	1
182-664	LOOM PIE-310 TX 300 (XH)	1
182-665	LOOM PIE-310D RX 300(XH)	1
C6385A	PRESSURE PAD	2
D0022A	ROLLER TRANSPORT 25 x 8	8
D1040A	BEARING HSG 'T' 8mm 12 Sq	4
E5004A	ROLL PIN 1/8 x 3/4in	6
E5005A	ROLL PIN 1/8 x 7/8in	6
E5019A	CIRCLIP 12mm	6
E5025A	CIRCLIP 8mm D1400	6
E5027A	ROLL PIN 1/8 x 1in	6
E5071A	PIN DOWEL 3 DIA x 14(m6)	6
E5073A	CIRCLIP 9.5mm 'E' TYPE	6
E5074A	PIN DOWEL 3 DIA x 8(m6) S/S	6
E5092A	CIRCLIP 'E' TYPE 12mm	6
E5098A	PIN DOWEL 3 DIA x 18 m6 S/S	6
E5122A	PIN GROOVED S8 3 x 14LG	6
F4134A	GEAR FOLD 20T x 8mm 2.0M	1
F4135A	GEAR FOLD 20T x 12mm 2.0M	1
F4150A	GEAR 40T x 8mm 1.0M	1
F4156A	GEAR 30T x 8mm 1.0M	1
F5004A	BELT 160XL 037	1
F5008A	BELT 220XL 037	1
F5011A	BELT 120XL 037	1
F5014A	BELT 100XL 037	1
F5054A	BELT 188T HTD 564-3M-09	1
F5153A	BELT 490-XL-037	1
G0079A	CLUTCH PIN	6
G1008C	SPRING PRESSURE WHEEL	4
G1094A	SPRING INT. PRESSURE	4
G1117A	SPRING HEAVY PRESSURE	4
G1136A	SPRING OMR SHAFT	4
G4005A	T BEARING 8mm 15 Sq	4
G5022A	CONVBELT MAT5P 666 x 15 2S	1

A0359A (Cardfolder Mk. 1)

PART	DESCRIPTION	QTY
181-147	CLUTCH W/D 179-159 SMCLUTCH (LENZE)	1
181-148	BRAKE W/D 179-108 2WXH (LENZE)	1
182-340	LOOM EMITTER 200 SM	1
182-341	LOOM RECEIVER W/A 200 SM	1
C8074A	ROLLER FOLD LOWER	1
C8076A	ROLLER FOLD UPPER	1
D0022A	ROLLER TRANSPORT 25 x 8	8
F4150A	GEAR 40T x 8mm 1.0M	1
F4151A	GEAR 48T x 8mm 1.0M	1
F4156A	GEAR 30T x 8mm 1.0M	1
F5004A	BELT 160XL 037	1
F5008A	BELT 220XL 037	1
F5011A	BELT 120XL 037	1
F5014A	BELT 100XL 037	1
F5054A	BELT 188T HTD 564-3M-09	1
F5153A	BELT 490-XL-037 BANDO	1

Blank Page

Section 2

Parts Identification

- 2.1 Chassis LH
- 2.2 Chassis RH
- 2.3 Chassis assembly
- 2.4 Outer cassette components
- 2.5 Inner cassette components
- 2.6 Pressure arm assembly
- 2.7 Fold plate 1 components
- 2.8 Drive components
- 2.9 Overguide components
- 2.10 Conveyor components
- 2.11 Fold rollers
- 2.12 Idle posts, hinges, drive belt & sundries
- 2.13 Covers
- 2.14 List of fasteners used
- 2.15 Interface Kit

Section 2 - Parts Identification

Using this section

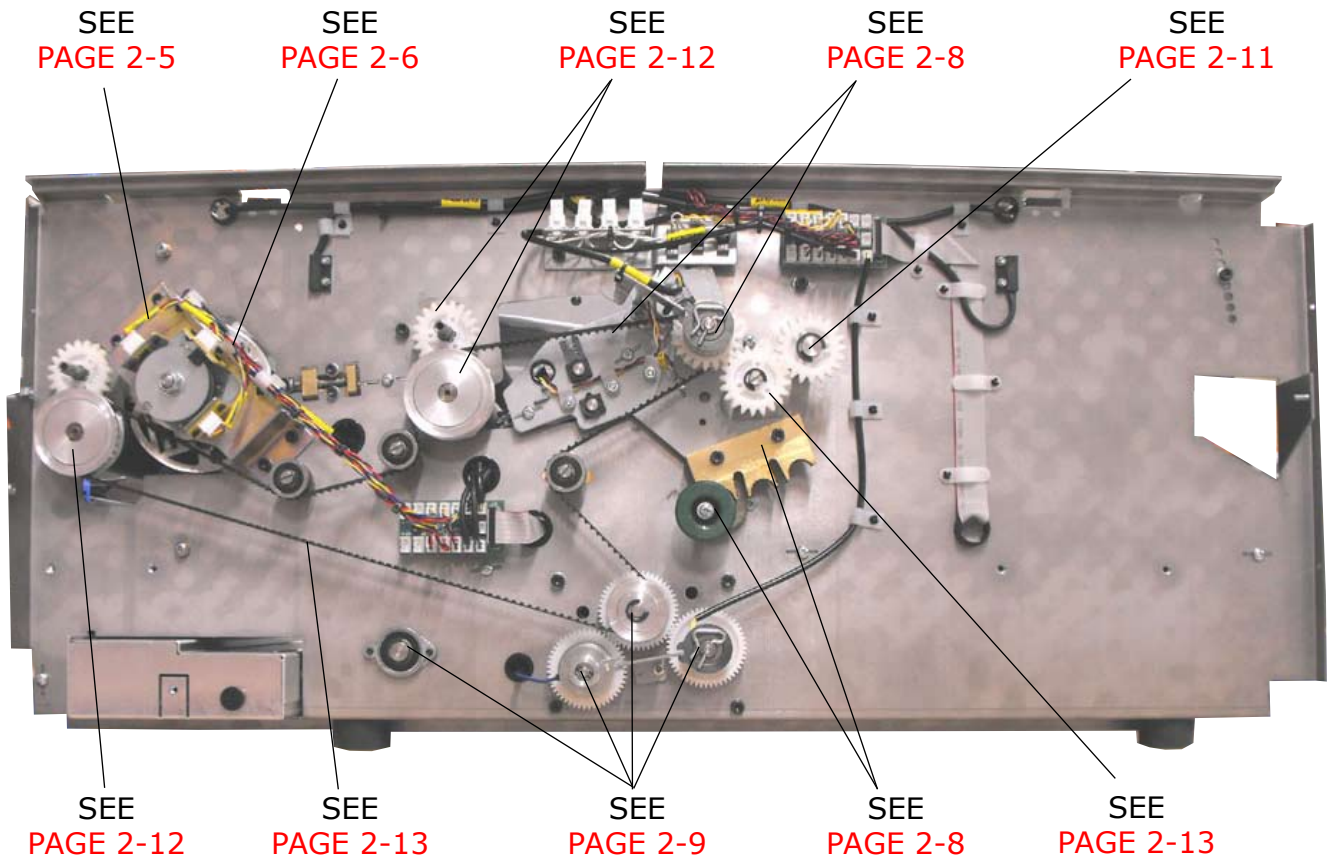
This section portrays components used on the 100/140 Cardfolder and their part numbers. To enable the relevant area to be identified, the Chassis LH and RH sides shown at the beginning will indicate the page on which a shaft or assembly can be found. Fasteners used throughout are not shown in the illustrations; instead, a list of fasteners with part numbers is shown in [Section 2.14](#).

References to LH & RH are viewed as standing from behind the paper path (ie. at input end of the machine). References are also made in some part descriptions to Operator side (LH) and Drive side (RH).

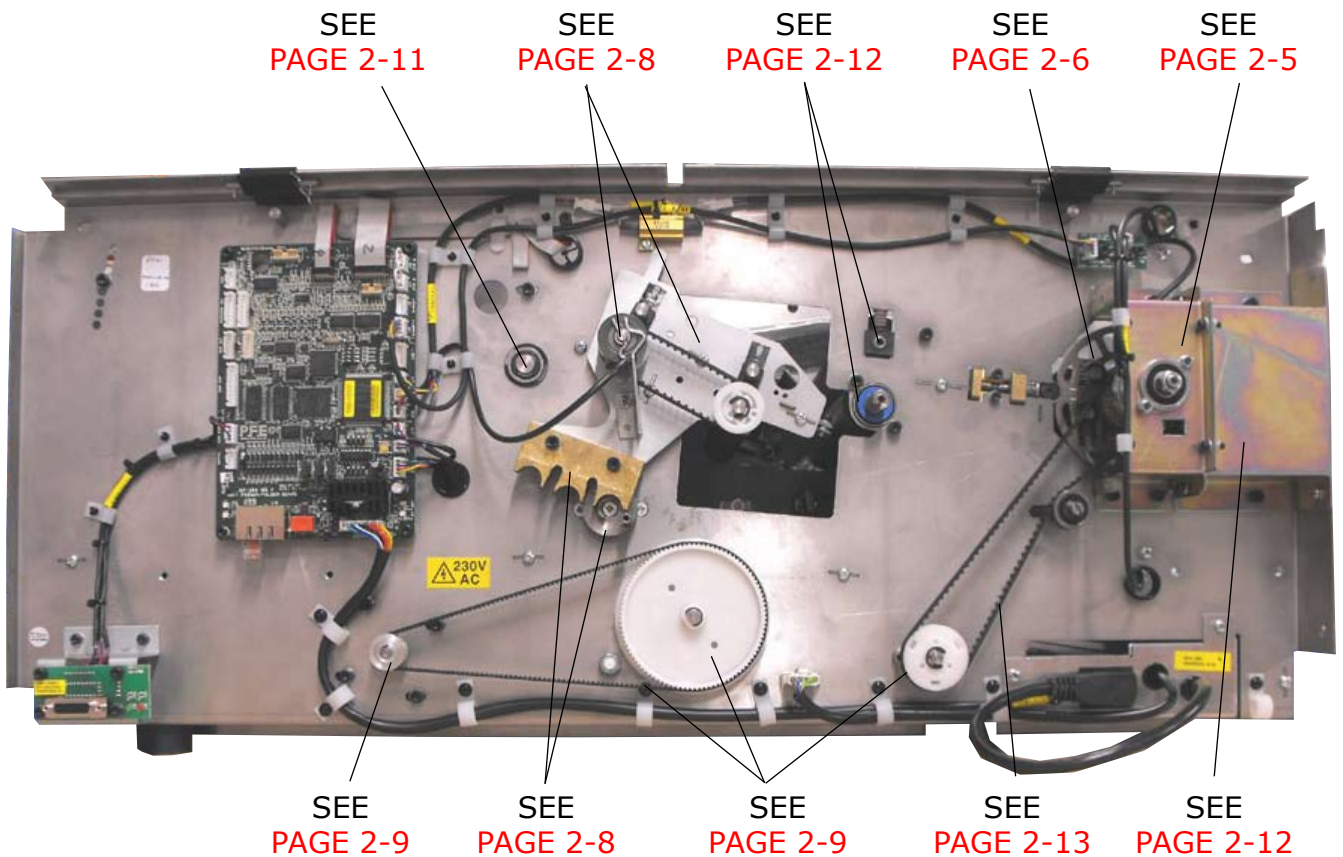
Quantities shown (where applicable) are per machine. This will apply even if the item is commonly used, eg. bearings, springs etc., and is shown on multiple pages. On each occurrence, the quantity shown will be the total for the machine. Any fasteners shown will be for reference only, hence quantity in each case will be A/R (as required).

Electrical Items

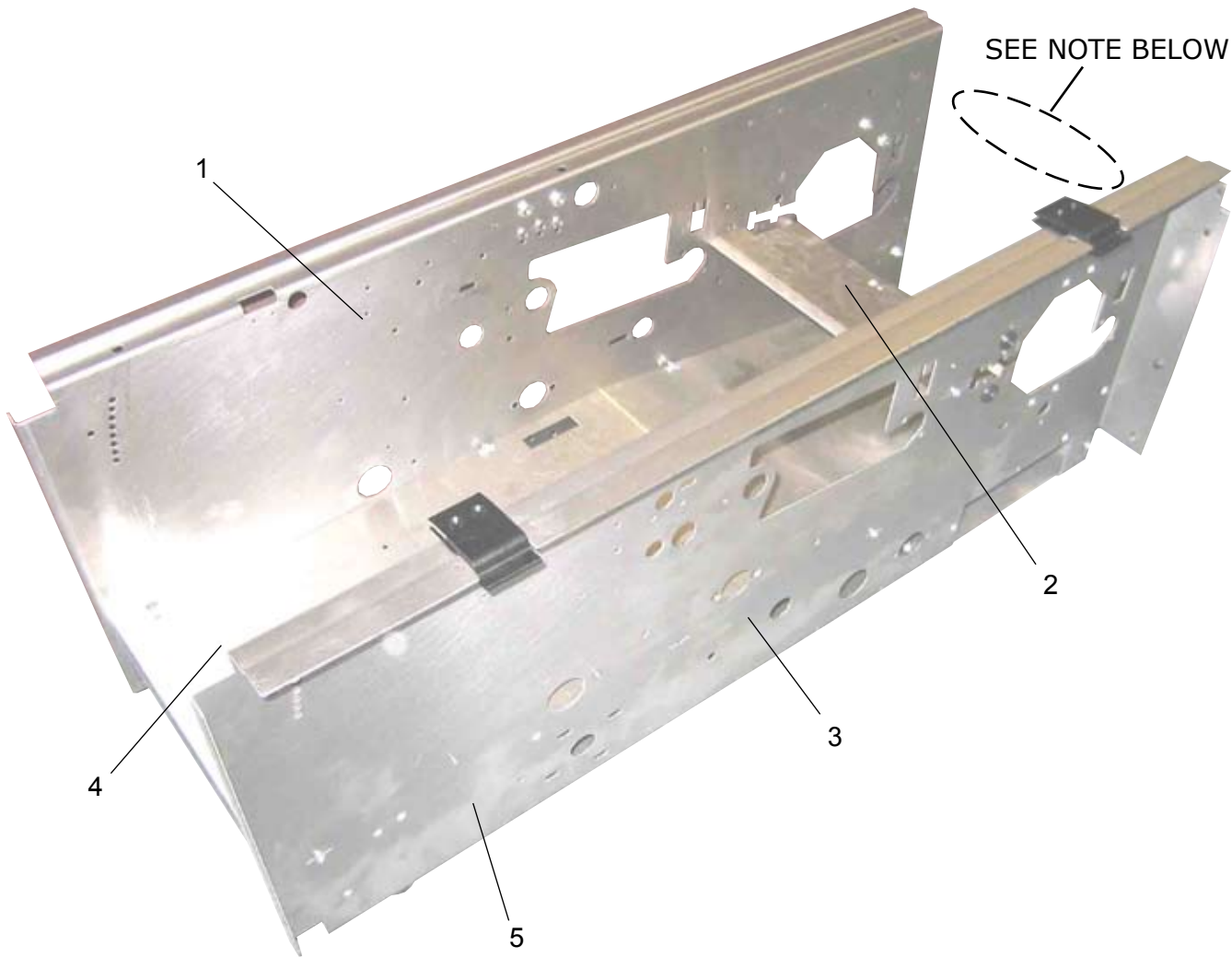
Part numbers for PCBs, clutches, brakes and sensors are shown in [Section 3](#). Their approximate physical locations on the machine are shown in the 'saddle-back' wiring diagram in [Section 3.5 Cardfolder Mk 2 Wiring](#) and [Section 3.6 Cardfolder Mk 1 Wiring](#).



2.1 - Chassis LH (Operator)



2.2 - Chassis RH (Drive)

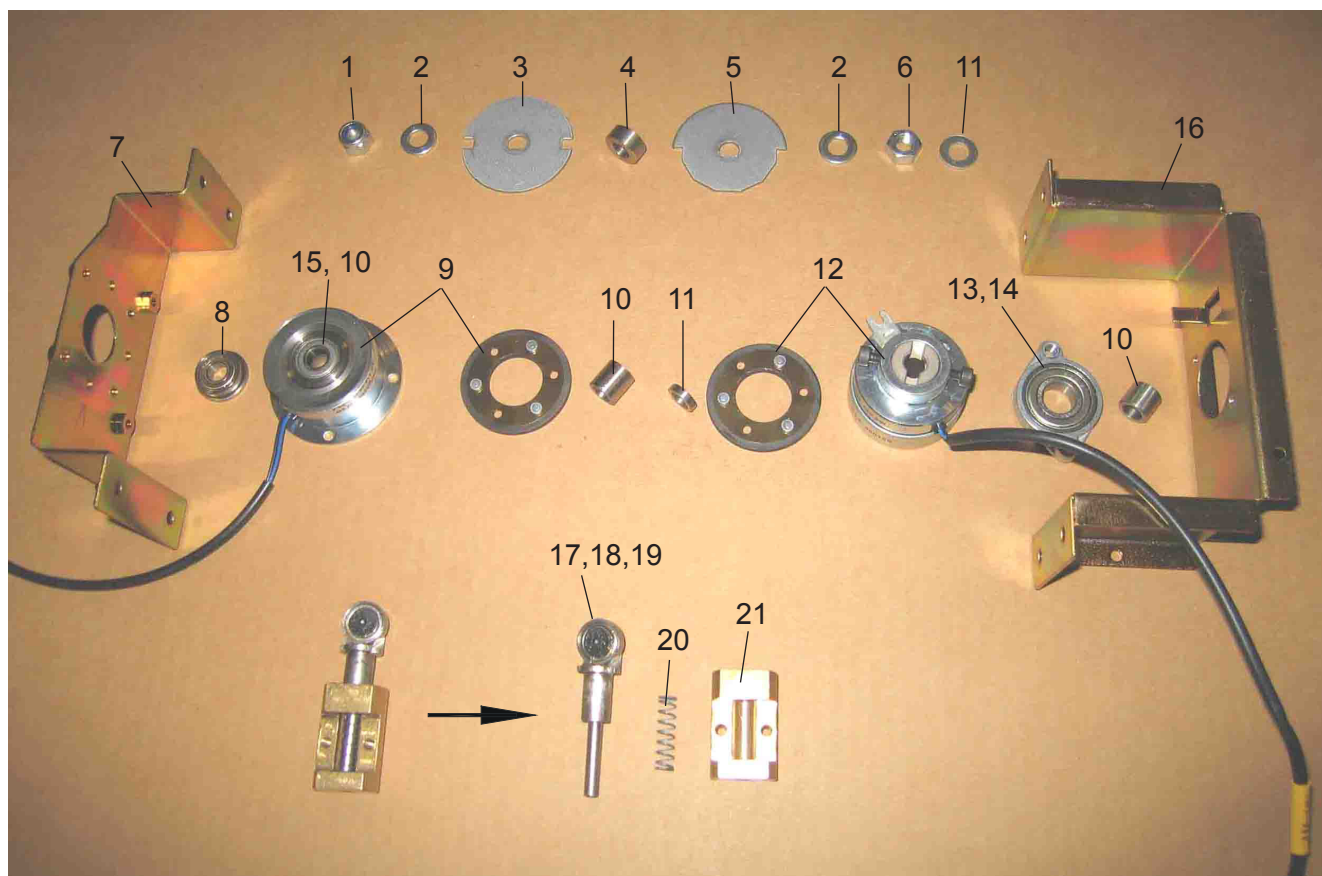


2.3 - Chassis Assembly

Ref.	Part No.	Description	
1	R2859A	CARDFOLDER CHASSIS OP (LH)	1
2	R2840A	INFEED BRIDGE	1
3	R2860A	CARDFOLDER CHASSIS DR (RH)	1
4	R2850A	MAIN BRIDGE	1
5	C8078A	RUBBER FOOT (UNDERNEATH)	4

FOR COVER AND HINGE DETAILS, SEE [PAGE 2.14](#).

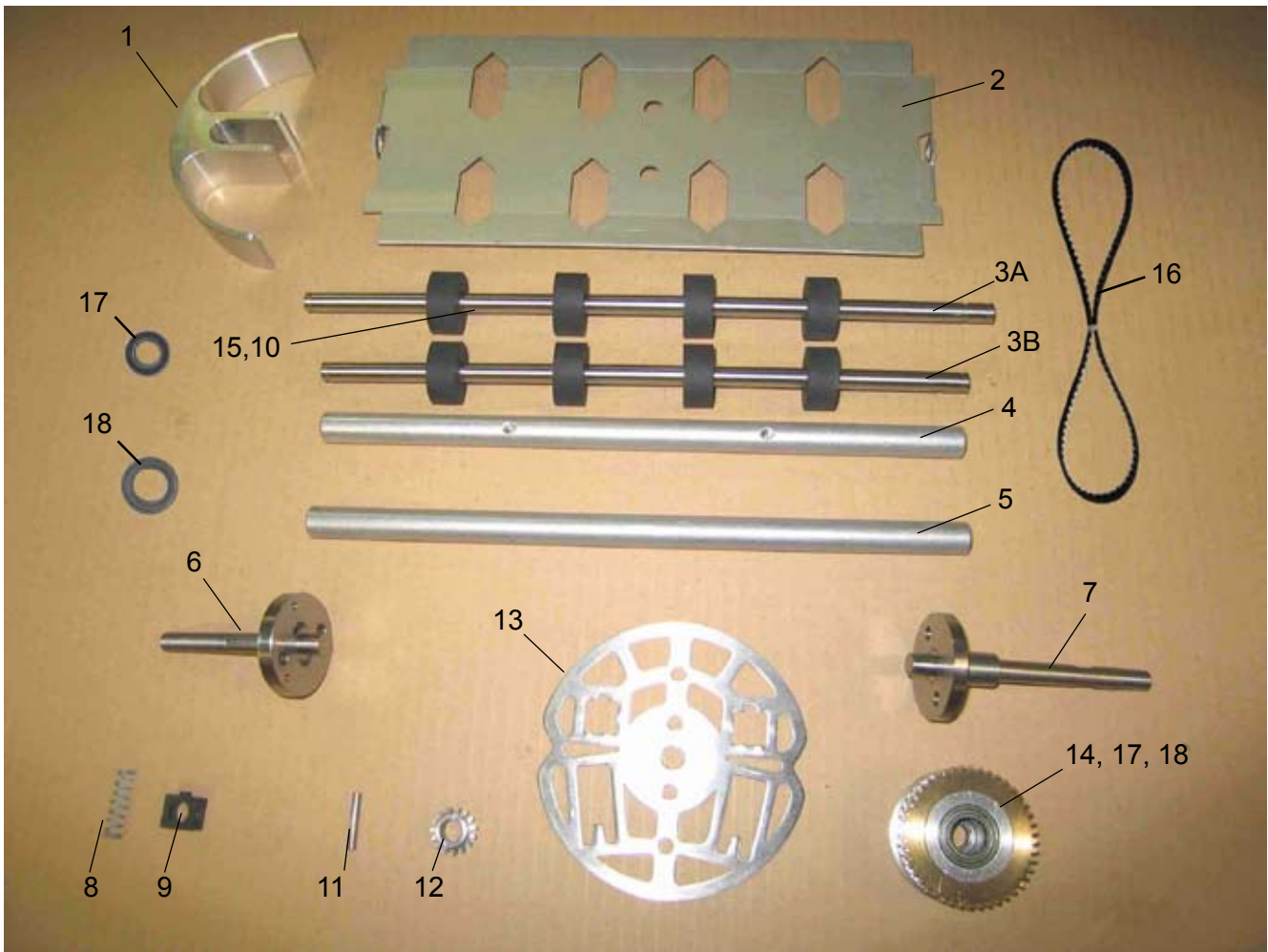
NOTE: OUTFEED GUIDE PLATE R2981A IS EXTERNALLY ATTACHED ON FRONT FLANGES (LIP FACING INBOARD AND DOWN).



2.4 - Outer Cassette Components

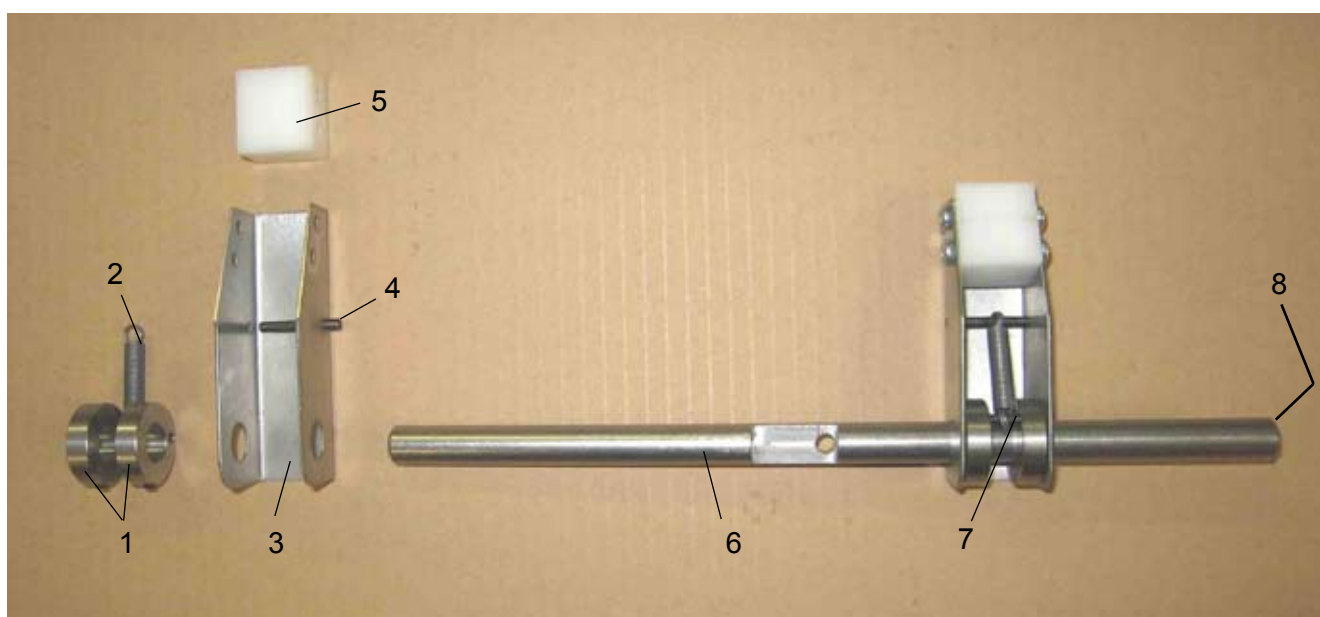
Ref.	Part No.	Description	Qty
1	E3525A	M8 NYLOC NUT	2
2	E4039A	M8 WASHER	A/R
3	R2847A	INDEXING SENSOR DISC OUTER	1
4	P2415A	BRAKE SPACER	1
5	R2846A	INDEXING SENSOR DISC INNER	1
6	E3527A	M8 FULL NUT	1
7	R2845P	CASSETTE MOUNTING BRKT, BRAKE	4
8	E1102A	8mm FLANGED BRG	1
9	181-148	BRAKE, LENZE	1
10	P2451A	BEARING SPACER, 12.4mm	2
11	P2417A	CLUTCH SPACER, PULLEY	2
12	181-147	CLUTCH, LENZE	1
13	C0035A	12mm BRG HSG	1
14	E1054A	12mm BALL BRG	9
15	E1136A	BEARING, BALL 8 x 19 x 6mm	1
16	R2844P	CASSETTE MOUNTING BRKT, CLUTCH	1
17	C4428A	INDEXING ROD	2
18	E1061A	8mm BALL BRG	2
19	E2565A	SCREW M5 x 10 CSK	2
20	G1136A	OMR SPRING (BLUE)	6
21	C6378A	INDEXING ROD HOUSING	2

NOTE: On later models, Sensor Mounting Bracket - B9108A added & Cassette Strengthening Bracket B9233P is also used on LH side.



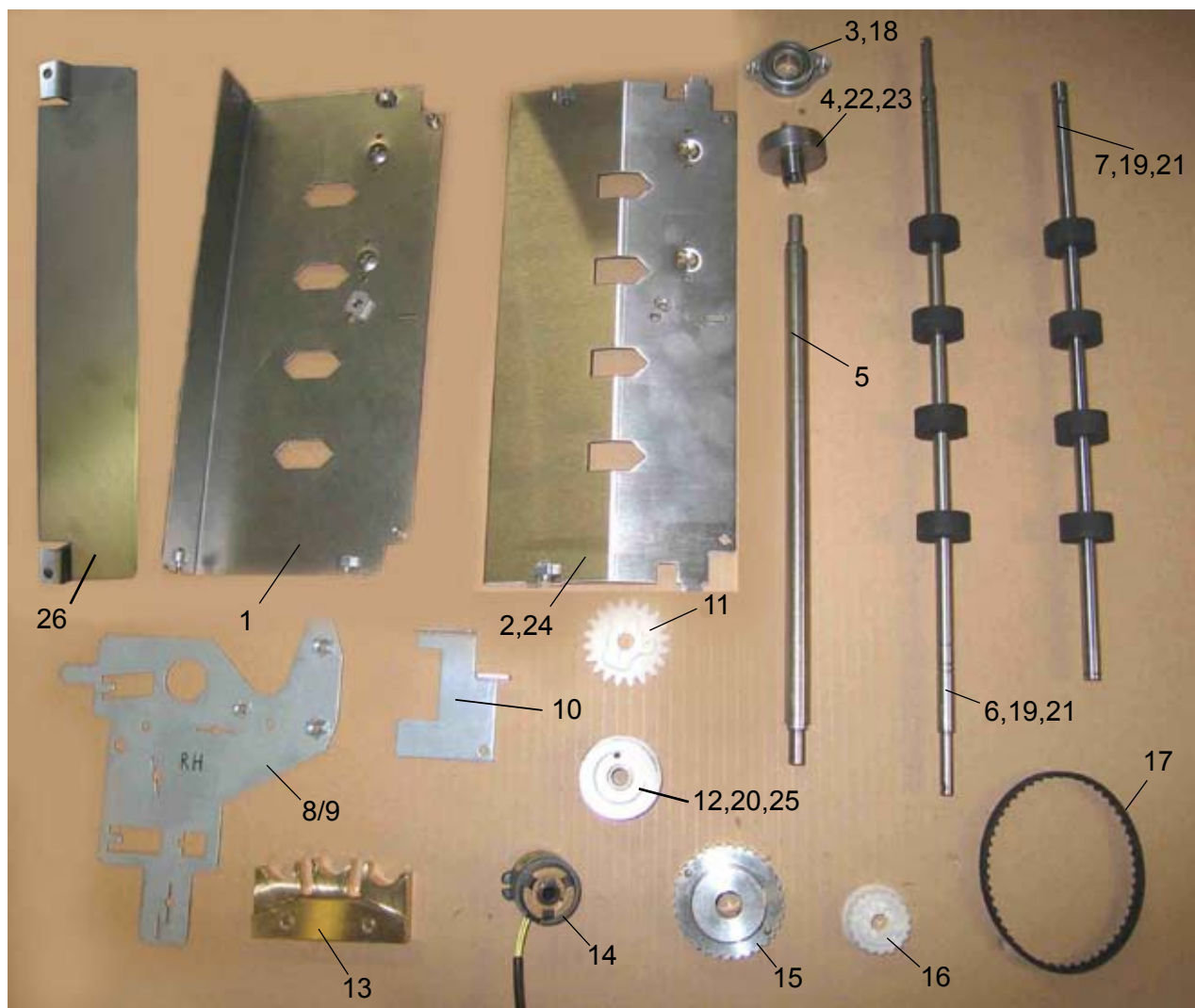
2.5 - Inner Cassette Components

Ref.	Part No.	Description	Qty.
1	C6397A	CASSETTE SHOE	4
2	R2841E	CASSETTE PLATE	2
3A	C9638A	FEED GEAR SHAFT	2
3B	C9699A	FEED SHAFT	2
4	C9639A	INDEXING TIE BAR	4
5	USE ITEM 4 (early versions not drilled/tapped)		
6	C1035A	INDEXING BRAKE SHAFT ASSY.	1
7	C1034A	INDEXING CLUTCH SHAFT ASSY.	1
8	G1136A	OMR SPRING (BLUE)	6
9	D1040A	'T' BRG MIN, 8mm	16
10	E5073A	9.5mm 'E' CLIP	A/R
11	E5122A	PIN, GROOVED Ø3mm x 14	A/R
12	F4266A	GEAR, FEED 15T 1M x 8mm	2
13	R2836A	INDEXING PLATE	2
14	F0053A	INDEXING PULLEY ASSY.	1
15	D0022A	ROLLER TRANSPORT Ø25mm x 8	32
16	F5008A	BELT 220XL	1
17	E1061A	BEARING BALL 8 x 16 x 5	1
18	E1103A	BEARING BALL 12 x 21 x 5	1



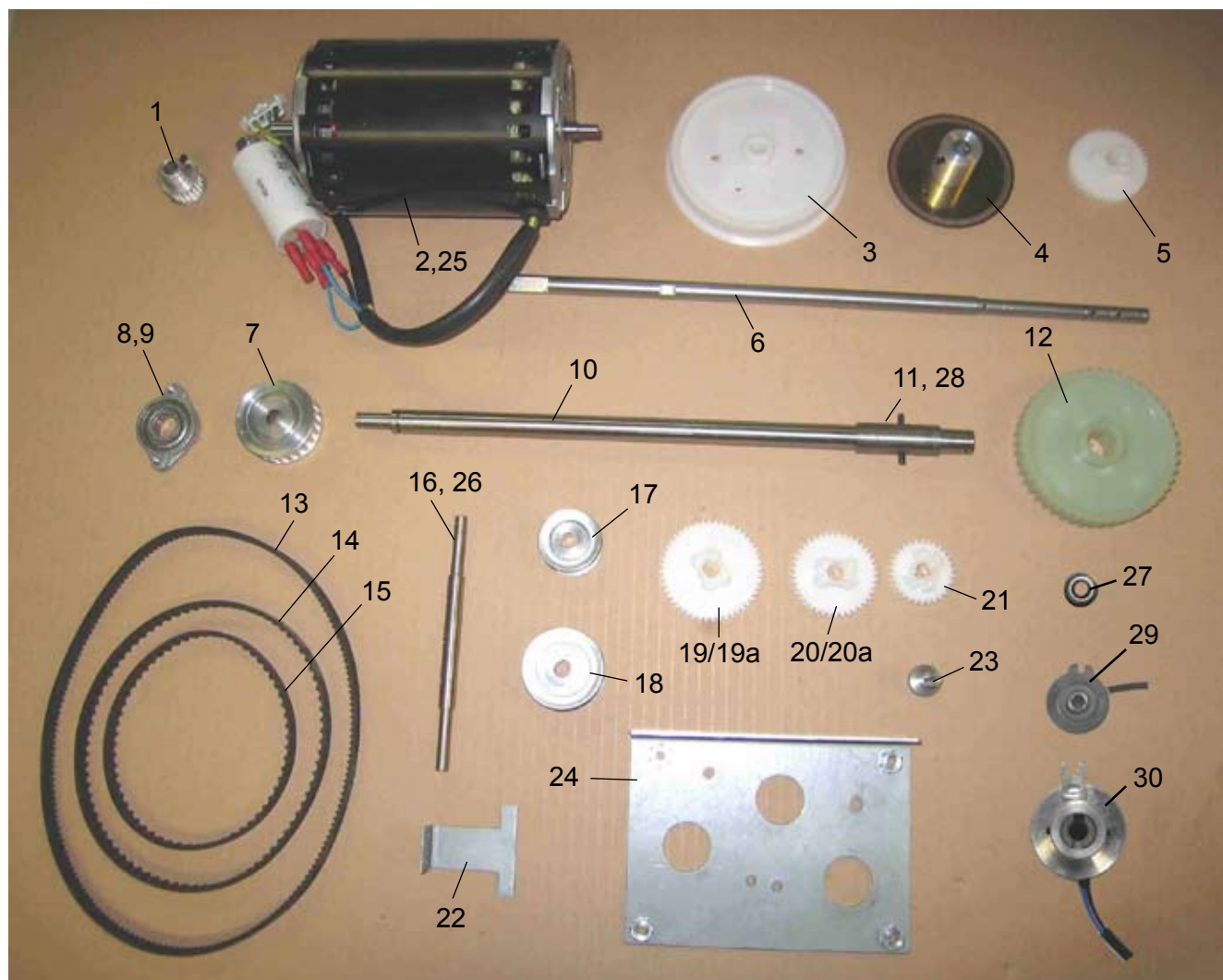
2.6 - Pressure Arm Assembly

Ref.	Part No.	Description	Qty.
1	P2437A	PRESSURE PAD COLLAR	8
2	G1008C	SPRING, PRESSURE WHEEL	4
3	B9164A	PRESSURE PAD BRKT	4
4	E5027A	ROLL PIN Ø1/8" x 1"	A/R
5	C6385A	PRESSURE PAD	4
6	C9640A	INDEXING SENSOR BAR	2
7	E5005A	CIRPIN, Ø1/8" x 7/8"	A/R
8	C2751A	WASHER 'D' SHAFT (not shown)	2



2.7 - Fold Plate 1 Components

Ref.	Part No.	Description	Qty.
1	R2856A	INPUT FOLD PLATE LOWER	1
2	R2855A	INPUT FOLD PLATE UPPER	1
3	C0046A	12mm BRG. HSG.	2
4	C3625A	GENEVA CAM	2
5	C9646A	CAM SHAFT	1
6	C9648A	INPUT F/PLATE DRIVE SHAFT	1
7	C9647A	INPUT F/PLATE SHAFT	3
8	R2848A	INPUT F/PLATE CARRIER, OP	1
9	R2849A	INPUT F/PLATE CARRIER, DR (SHOWN)	1
10	R2864A	CLUTCH/BRAKE BRACKET	2
11	F4134A	GEAR, FOLD 20T 2M x 8mm	4
12	F1434A	PULLEY 20XL CLUTCH BBRG	1
13	C6380A	GENEVA BLOCK	2
14	181-117	CLUTCH W/D EC25CW XH 24V	2
15	F1201A	PULLEY 32 XL	1
16	F1243A	PULLEY 18 XL x 8mm	2
17	F5014A	BELT 100 XL	1
18	E1054A	12mm BRG.	9
19	D0022A	ROLLER, TRANSPORT Ø28mm x 8	32
20	E1134A	BEARING BALL 8 x 16 x 5mm	2
21	E5073A	9.5mm 'E' CLIP	A/R
22	P2420A	GENEVA PIN	2
23	D1077A	PAPER EJECT KNOB (not shown)	1
24	H0011A	POLYESTER SHIM	0.32m
25	E5126A	PIN GROOVED 3 DIA x 8 St Stl. (not shown)	6
26	B2-1428-A	FPI DEFLECTOR PLATE	1

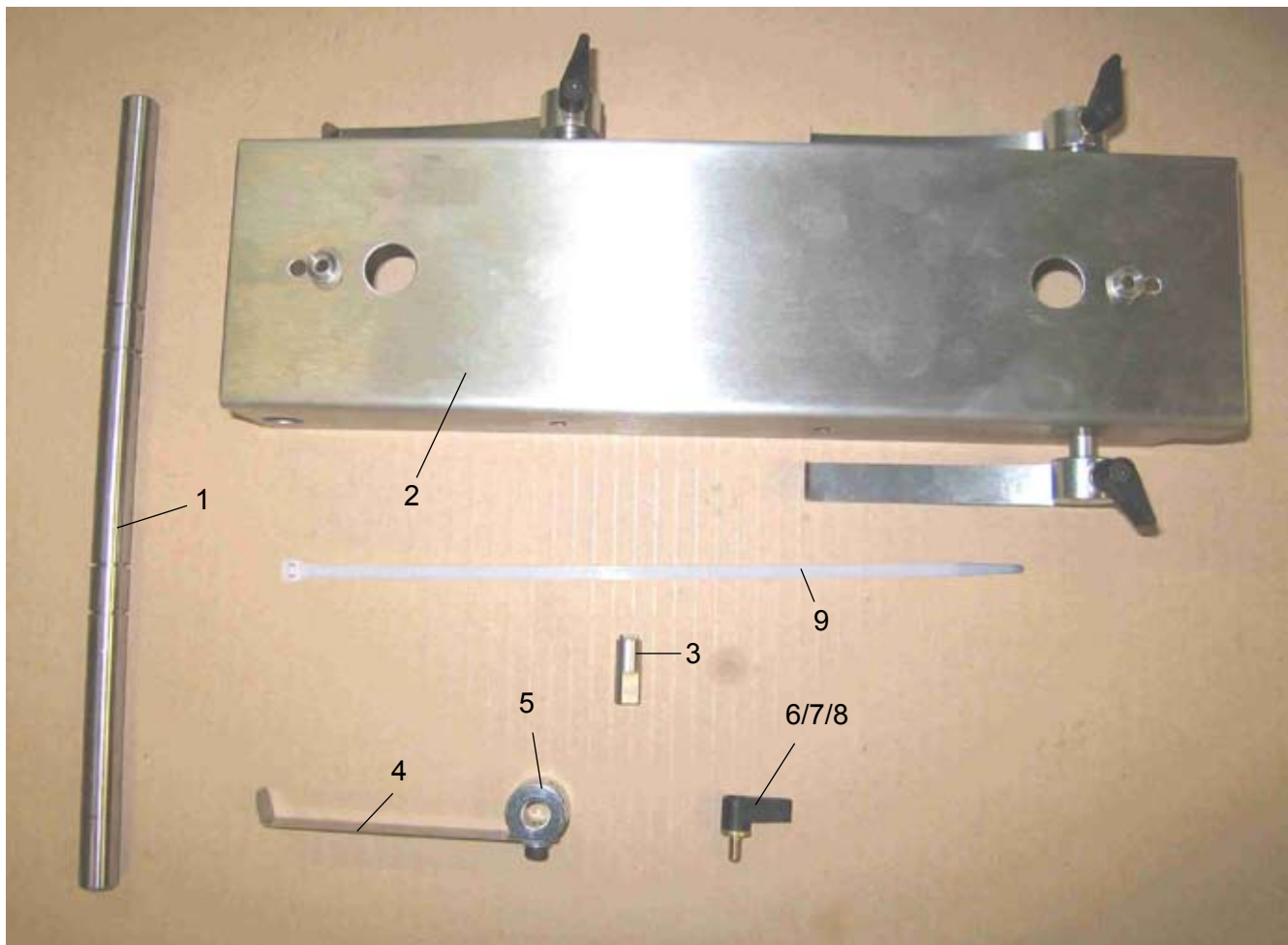


2.8 - Drive Components

Ref.	Part No.	Description	Qty.
1	F1251A	PULLEY 20T HTD3 x 8mm (230V)	1
1a	F1428A	PULLEY 16T HTD3 x 8mm (115V)	1
2	181-069	MTR W/D 179-072 4WJST CW (230V)	1
2a	181-569	MTR W/D 179-073 4WJST CW (115V)	1
3	F1196A	PULLEY, MOULDED 96T HTD3	1
4	B7708A	SENSOR DISC, 130 SLOT	1
5	F4150A	GEAR 40T 1M x 8mm (INBOARD)	3
6	C9645A	MAIN DRIVE SHAFT	1
7	F1375A	PULLEY ASSY 25 XL	1
8	C0035A	12mm BEARING HSG	6
9	E1054A	12mm BEARING	9
10	C9641A	PULLEY, SHAFT	1
11	E5010A	ROLL PIN, Ø1/8" x 1 1/4"	1
12	F1127A	PULLEY 48 XL	1
13	F5054A	BELT 188T HTD3 564-3M (FOR ITEM 1)	1
14	F5004A	BELT 160X L (FOR ITEM 12)	1
15	F5011A	BELT 120 XL (FOR ITEM 17)	1
16	C9649A	CLUTCH SHAFT	2
17	F1367A	PULLEY 16 XL x 8mm	2
18	F1366A	PULLEY 20 XL x 8mm	1
19	F4151A	GEAR 48T 1M x 8mm	2
19a	A2-1125-A*	48T GEAR & HUB ASSY for Lenze clutch (outside)	1
	C2-1080-A*	BEARING BUSH *Assembled together - see	1
	C2-1081-A*	ARMATURE SPACER also document K4049A	1
	E1061A*	BEARING BALL 8 x 16 x 5mm	2

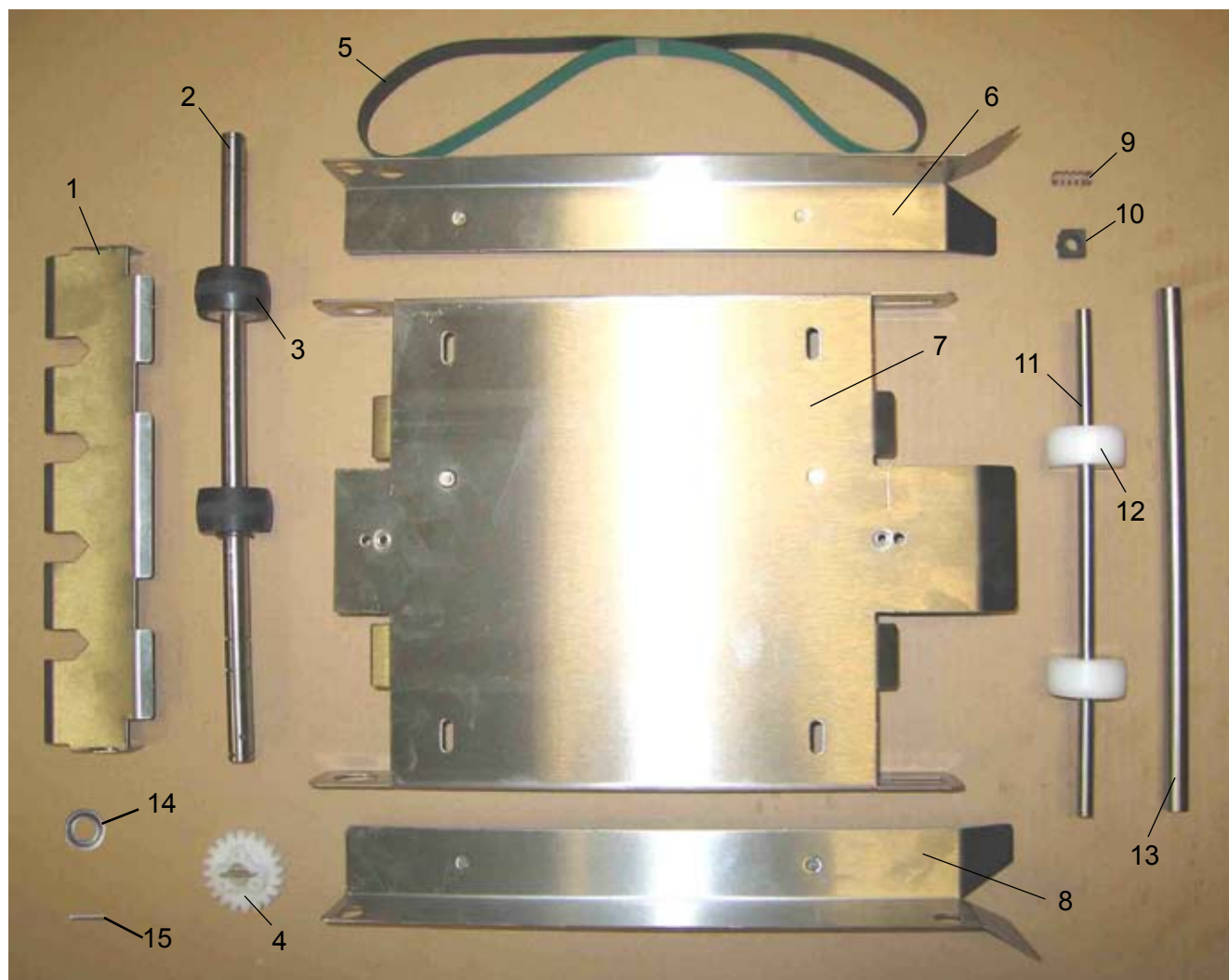
100/140 CARDFOLDER SERVICE MANUAL

Ref.	Part No.	Description	Qty.
20	F4150A	GEAR 40T 1M x 8mm	2
20a	A2-1126-A*	40T GEAR & HUB ASSY for Lenze clutch (outside)	1
	C2-1080-A*	BEARING BUSH	1
	C2-1081-A*	ARMATURE SPACER	1
	E1061A*	BEARING BALL 8 x 16 x 5mm	2
21	F4156A	GEAR 30T 1M x 8mm	2
22	R2857A	CLUTCH/BRAKE LOCATOR	2
23	P2156A	GEAR POST	2
24	R2852A	GEAR CLUTCH PLATE	1
25	E0181A	FAN 2 5/8" DIA. CCW (not shown)	1
26	E5098A	PIN DOWEL 3 DIA x 18 (not shown)	2
27	E1080A	BEARING BALL 3/8" FLANGE MINATURE	1
28	C3134A	SLEEVE	1
29	181-127	CLUTCH W/D EC25CCW XH 24V	1
30	181-132	CLUTCH W/D 179-154 2WXH	1



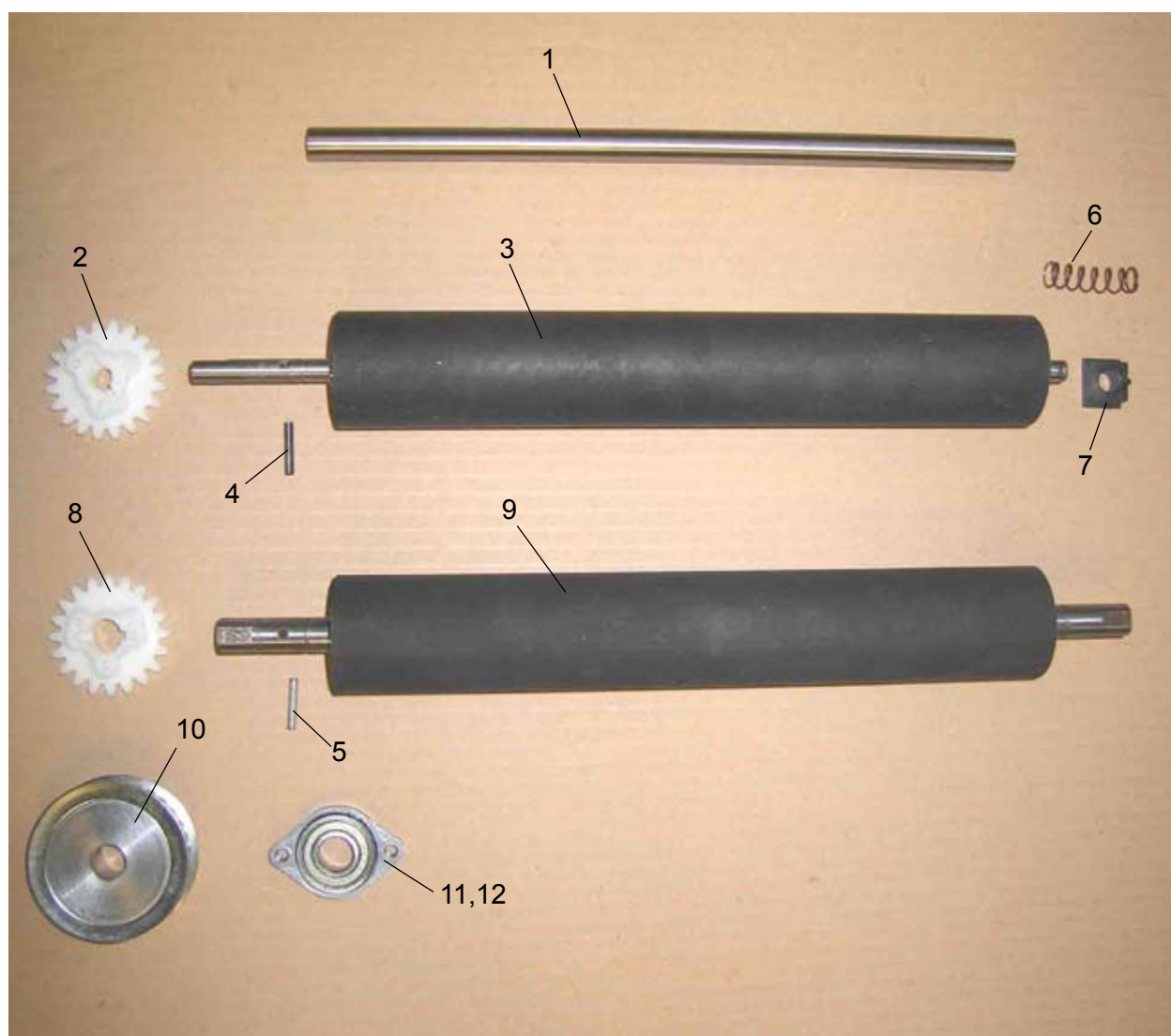
2.9 - Overguide Components

Ref.	Part No.	Description	Qty.
1	C9644A	OVERGUIDE PIVOT SHAFT	1
2	R2843A	SENSOR OVERGUIDE BRIDGE	1
3	P2414A	SPRING COVER POST	4
4	B0188A	GUIDE SPRING, CONVEYOR	4
5	C2181C	FORM CONTROLLER COLLAR	4
6	D1030A	LOCK LEVER	4
7	C2404A	LOCK SCREW	4
8	E2560A	SCREW, M3 x 6 CSK HD	A/R
9	169-106	CABLE TIE 7.6 x 370mm	2



2.10 - Conveyor Components

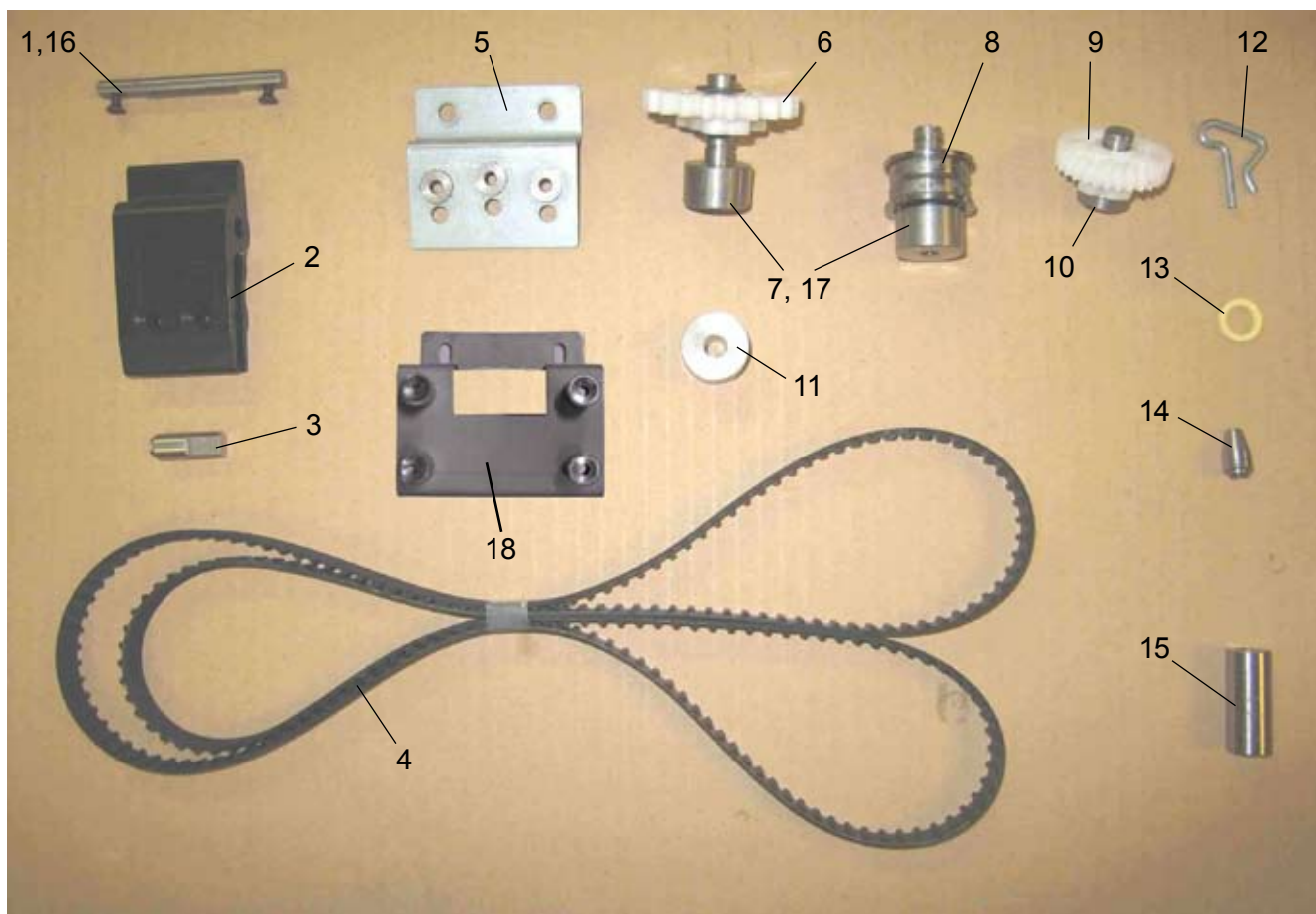
Ref.	Part No.	Description	Qty.
1	B9105A	CONVEYOR GUIDE PLATE	1
2	C9642A	CONVEYOR DRIVE SHAFT	1
3	C8130A	CONVEYOR DRIVE ROLLER	2
4	F4135A	GEAR FOLD 20T 2M X12mm	3
5	G5022A	CONVEYOR BELT	1 SET
6	B9107A	SIDE GUIDE, RH	1
7	R2842A	CONVEYOR BED	1
8	B9106A	SIDE GUIDE, LH	1
9	G1117A	SPRING, HEAVY PRESSURE (RED)	2
10	D1040A	'T' BRG. MIN, 8mm	16
11	C9643A	CONVEYOR IDLE SHAFT	1
12	P2145A	CONVEYOR DRIVE ROLLER	2
13	C9691A	OVERGUIDE SUPPORT SHAFT	3
14	E1087A	BEARING FL 12 x 21 x 5mm	2
15	E5098A	PIN DOWEL 3 DIA x 18	4



2.11 - Fold Rollers

Ref.	Part No.	Description	Qty.
1	C9691A	OVERGUIDE SUPPORT SHAFT*	3
2	F4134A	GEAR, FOLD 20T 2M x 8mm	1
3	C8076A	FOLD ROLLER UPPER	1
4	E5004A	Ø1/8" x 3/4" ROLL PIN	1
5	E5097A	Ø3 x 20mm DOWEL PIN	1
6	G1094A	SPRING, INT. PRESSURE (RED)	2
7	G4005A	8mm 'T' BEARING, LARGE	2
8	F4135A	GEAR, FOLD 20T 2M x 12mm	1
9	C8074A	FOLD ROLLER LOWER	1
10	F1136A	PULLEY 32 XL	1
11	C0035A	12mm BEARING HOUSING	2
12	E1054A	12mm BALL BEARING	2

* Fitted to first (innermost) roller pair only.



2.12 - Idle Posts, Hinges, Drive Belt & Sundries

Ref.	Part No.	Description	Qty.
1	C4366A	HINGE PIN	2
2	C6358E	HINGE	2
3	P2414A	SPRING COVER POST	2
4	F5153A	BELT, 490 XL 037 (MAIN DRIVE)	1
4a	F5008A	BELT, 220 XL 037 (CASSETTE DRIVE)	1 NOT SHOWN
5	R2853A	SENSOR BRACKET*	1
6	F4134A	GEAR, 20T 2M x 8mm	SEE NOTE
7	C3626A	IDLE POST	SEE NOTE
8	E1078A	8mm FLANGED BEARING	SEE NOTE
9	F4156A	GEAR, 30T 1M x 8mm	SEE NOTE
10	P2156A	GEAR POST	SEE NOTE
11	P2418A	CONVEYOR POST SPACER	SEE NOTE
12	G0079A	CLUTCH PIN	A/R
13	G6002A	8mm PLASTIC WASHER (YELLOW)	A/R
14	P2247A	MODULE LOCATION SPIGOT	2
15	C3627A	POST GEAR CLUTCH PLATE**	4
16	E2502A	M3 x 8 CSK HD SCREW	4
17	C2927A	IDLER 'T' BOLT (not shown)	2
18	R2858A	COMMS BRACKET	1

* Later versions extended for 4-way SM connectors

** Later versions swaged into plate

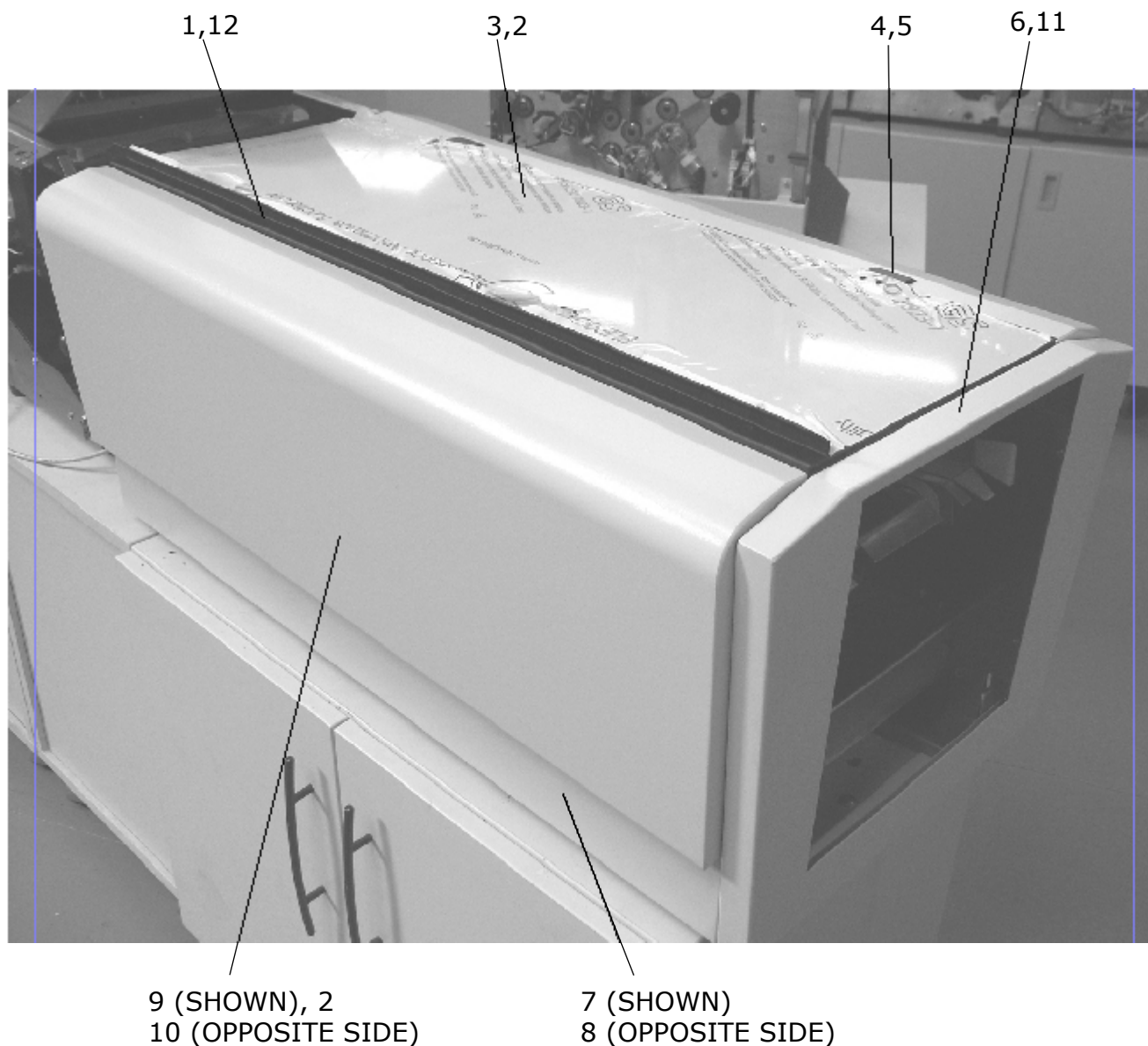
NOTE

Idler comprising items 6, 7 & 11 used in 1 off location.

Idler comprising items 7 & 8 used in 4 off locations.

Idler comprising items 9 & 10 used in 2 off locations.

100/140 CARDFOLDER SERVICE MANUAL



2.13 - Covers

Ref.	Description	Part No.	Qty.
1	TOP COVER HANDLE	R2869F	1
2	SWITCH MAGNET SMALL	131-824	4
3	CARDFOLDER VIEWING PANEL	G7162A	1
4	HINGE	C6358E	2
5	HINGE PIN	C4366A	2
6	CARDFOLDER BACK COVER	B9113T	1
7	CARDFOLDER WIRING SKIRT, OP (LH)	B9111T	1
8	CARDFOLDER WIRING SKIRT, DR (RH)	B9112T	1
9	CARDFOLDER SIDE COVER, OP (LH)	B1887T	1
10	CARDFOLDER SIDE COVER, DR (RH)	B1886T	1
11	INFEED PLATE	R2854T	1
(Item 11 used only on later versions - early version is shown)			
12	FOAM TAPE	E0056A	0.81m

ALSO USED WHEN FEEDER IS FITTED: CARDFOLDER/FEEDER COVER PLATE, B9118S, QTY. 1 WITH COVER STOP E0003A, QTY. 250mm.

2.14 - List of Fasteners Used**SCREWS**

E2502A	M3 x 8 CSK HD SCREW
E2559A	M3 x 10 POZI PAN HD SCREW
E2815A	M4 x 4 POZI PAN HD SCREW
E2512A	M4 x 6 CAP HD SCREW
E2509A	M4 x 8 CAP HD SCREW
E2624A	M4 x 8 POZI PAN HD SCREW
E2520A	M4 x 8 GRUB SCREW
E2507A	M4 x 10 CAP HD SCREW
E2581A	M4 x 12 POZI PAN HD SCREW
E2516A	M5 x 10 CAP HD SCREW
E2824A	M5 x 10 POZI CSK HD SCREW
E2527A	M5 x 16 CSK HD SCREW
E2508A	M5 x 12 CAP HD SCREW
E2523A	M5 x 20 CAP HD SCREW
E2567A	M5 x 20 CSK HD SCREW
E2574A	M5 x 45 CAP HD SCREW

WASHERS & NUTS

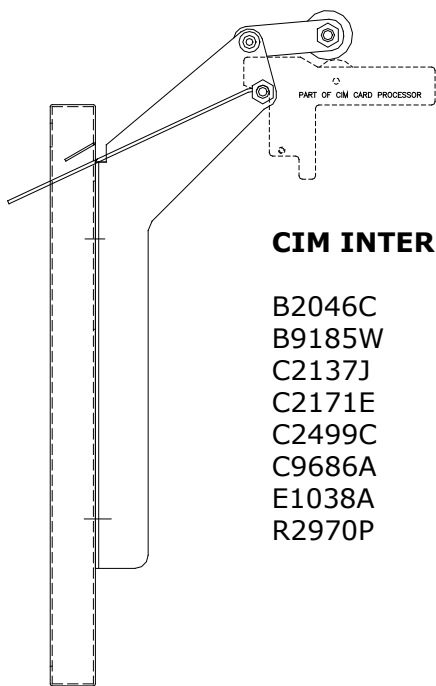
E4011A	M4 WASHER
E4012A	M5 WASHER
E4051A	WAVED WASHER 22ID (FOR 12mm FL. BRG. E1087A)
E0367A	WAVED WASHER 23ID (FOR 8mm FL. BRG. E1078A)
E0367A	WAVED WASHER 23ID (FOR 3/8" FL. BRG. E1080A)
G6001A	WASHER, SPRING
G6002A	8mm PLASTIC WASHER (YELLOW)
E3501A	M5 NUT

DOWEL PINS & CIRCLIPS

E5074A	Ø3mm x 8 DOWEL PIN
E5071A	Ø3mm x 14 DOWEL PIN
E5122A	Ø3mm x 14 GROOVED PIN (S8)
E5098A	Ø3mm x 18 DOWEL PIN
E5004A	Ø1/8" x 3/4" ROLL PIN
E5005A	Ø1/8" x 7/8" ROLL PIN
E5027A	Ø1/8" x 1" ROLL PIN
E5025A	8mm CIRCLIP
E5073A	9.5mm 'E' CLIP
E5019A	12mm CIRCLIP
E5092A	12mm 'E' CLIP

2.15 - Interface Kit

An interface kit is available, for CIM card processing machines. For full details of connecting the interface, contact Technical Support Department.



CIM INTERFACE KIT A3295A

B2046C	WHEEL SIDE ARM	QTY. 2
B9185W	CIM INPUT COVER	QTY. 1
C2137J	CRANK PIN	QTY. 4
C2171E	EJECT WHEEL 12mm	QTY. 2
C2499C	WHEEL PIVOT	QTY. 2
C9686A	PIVOT ROD	QTY. 1
E1038A	OILITE PL 8x12x12mm	QTY. 2
R2970P	INTERFACE BRACKET	QTY. 1

Section 3

Electrical items and Wiring Diagrams

- 3.1 Electrical items Bill of Material
- 3.2 Feeder/folder PCB circuit diagram (part 1)
- 3.2 Feeder/folder PCB circuit diagram (part 2)
- 3.3 Cardfolder interface PCB circuit diagram
- 3.4 Long range sensor PCB circuit diagram
- 3.5 Cardfolder wiring diagram (Mk. 2)
- 3.6 Cardfolder wiring diagram (Mk. 1)

100/140 CARDFOLDER SERVICE MANUAL

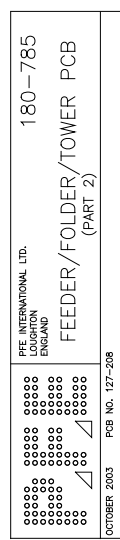
3.1 - 100/140 Cardfolder electrical items Bill of Material

Ref	Part No.	Description	Qty
1	181-069	MTR W/D 179-072 4WJST CW (230v)	1
or			
1a	181-569	MTR W/D 179-073 4WJST CW (115v)	1
2	181-117	CLUTCH W/D EC25CW XH 24V	2
3	181-127	CLUTCH W/D EC25CCW XH 24V	2
3a	181-132	CLUTCH W/D 179-154 2WXH LENZE	2
4	181-147	CLUTCH W/D 179-159 SM LENZE	1
5	181-148	BRAKE W/D 179-108 2WXH LENZE	1
6	180-759	PCB SPLIT 5SEN 5SOL H/D	2
7	180-761	PCB SPLITTER 6TX H/D	1
8	180-762	PCB SPLITTER 6RX H/D	1
9	180-785	PCB ASSY AM4 TWR/FEEDER	1
10	180-789	PCB CARDFOLDER INTERFACE	1
11	180-790	PCB LONG RANGE SENSOR	1
12	180-794	PCB ASSY PHOTOLOGIC DISK	4
13	182-437	LOOM EMITTER 100 XH	1
14	182-438	LOOM RECEIVER W/A 100 XH	3
15	182-440	LOOM EMITTER 200 XH	3
16	182-442	LOOM RECEIVER N/A 200 XH	1
17	182-443	LOOM EMITTER 300 XH	1
18	182-445	LOOM RECEIVER N/A 300 XH	1
19	182-664*	LOOM PIE-310 TX 300 XH (L/R SENSOR)	1
20	182-665*	LOOM PIE-310D RX 300 XH (L/R SENSOR)	1
* Sensor PCB for these looms is separate item 117-240 Qty. 1 (matched pair) for items 19 & 20 together.			
21	182-557	100/140 T101 LINK	1
22	182-417	WIRED REED SW 3WSM (UL)	4
23	182-563	LOOM REED_SW LINK 3W	2
24	184-180	AM4 CARD FOLDER PSU ASSY	1

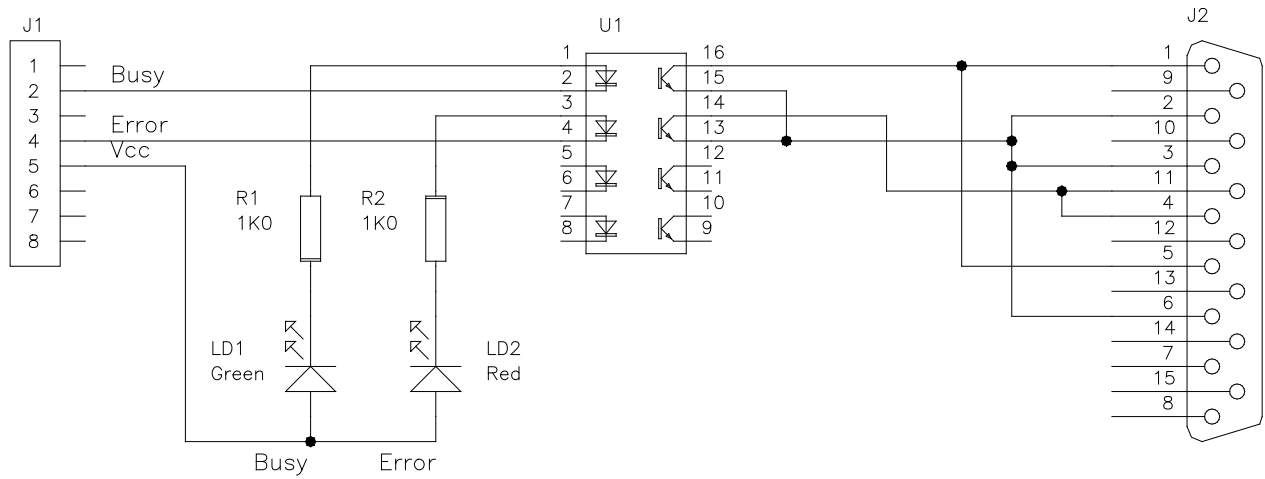
For PCB looms and ribbon cables, contact Technical Support Department

3.1 - 100/140 Cardfolder Electrical Items





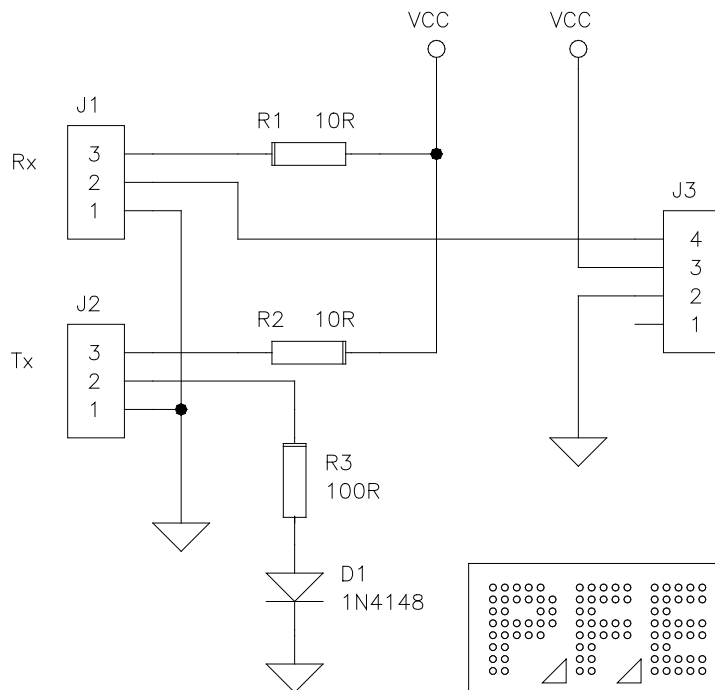
CARDFOLDER SERVICE MANUAL



Connect a 4.2mm PTH fixing hole to the mounting holes of connectors J2



3.3 - Cardfolder Interface PCB Circuit Diagram 180-789

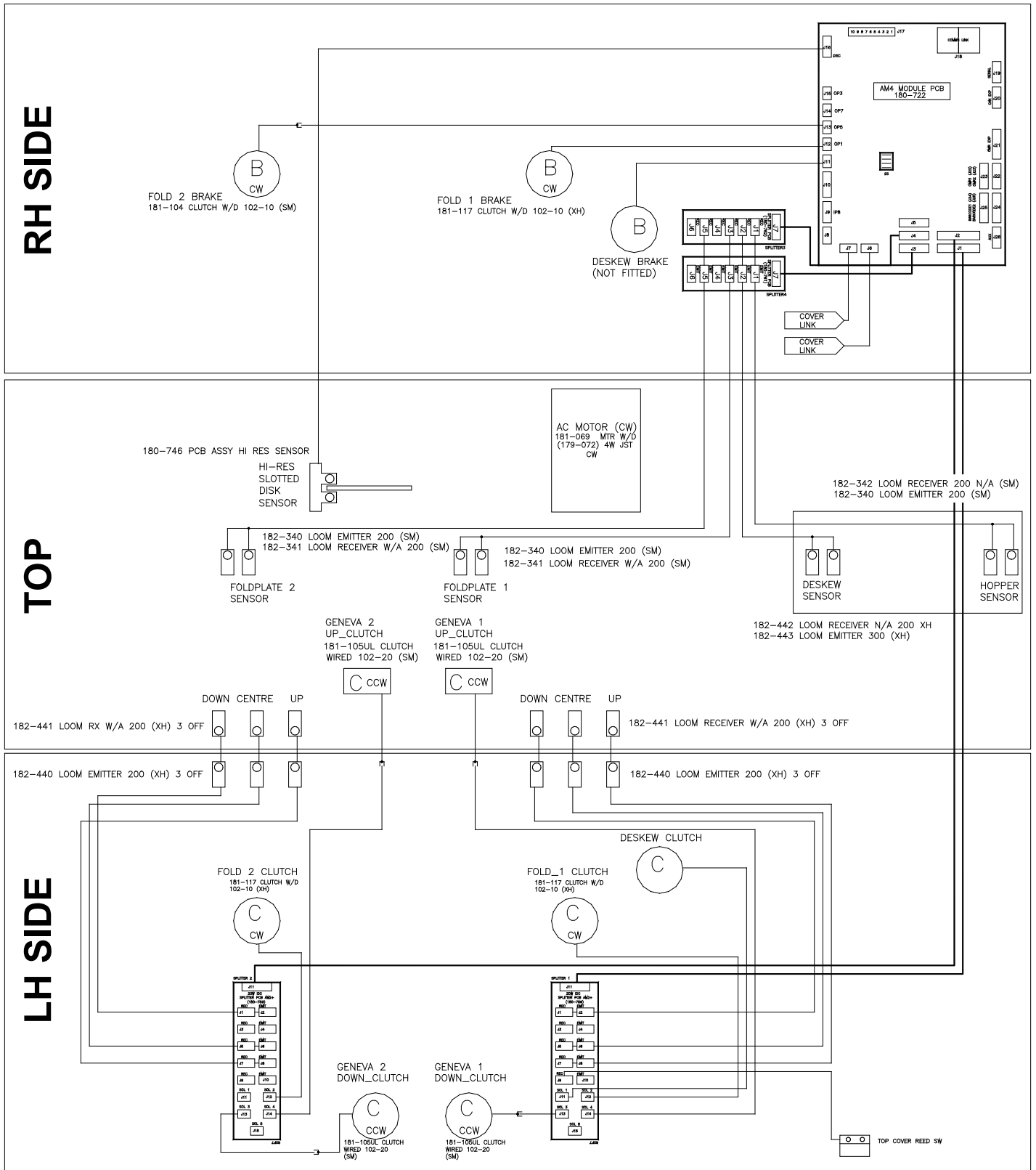


3.4 - Cardfolder Long Range Sensor PCB Circuit Diagram 180-790

[illegible]

(see also following page for Mk. 1 version).

Page 3 - 6



3.6 - Maximailer Cardfolder Mk. 1 Wiring (plan view)

(see also previous page for Mk. 2 version).

This diagram shows the approximate physical locations of sensors and components.

Section 4

Description of Operation

4.1	General
4.2	Cardfolder Sub-Modules
4.2.1	Infeed - Description
4.2.2	Infeed - Operation
4.2.3	Fold 1 - Description
4.2.4	Fold 1 - Operation
4.2.5	Fold 2 - Description
4.2.6	Fold 2 - Operation

Section 4 Description of Operation

4.1 General

The sole function of the Cardfolder (CF) is to receive a document with card/cards attached from a card affixing machine, prepare this for inserting and pass this onto the inserter.

Typically the CF will fold the document into Z, C or V fold, although it is theoretically possible to pass a document through the unit unfolded which must be envelope sized. (Furthermore, it is theoretically possible to perform a Double V fold although as yet untried.)

The CF can process documents with up to 4 cards attached, however these cannot be placed in the upper panel. The CF spec7 document defines the allowable card positions relative to the folds.

The CF must be the end module of the Maximailer system which can then support up to a further 3 modules from the standard range. The 3 plate folder is not a possible option.

The Maximailer system, when using the CF module, acts as a slave to the feed machine, waiting for, and reacting to an incoming document. The system will wait ready indefinitely, but will shut down the drives after a short time out, until the entry sensor is blocked. If the CF module is not selected, then the remaining modules of the Maximailer will perform as normal.

There is a signal interface from the CF to the feed machine that provides 2 signals:

1 - System Ready / Fault – a status signal, which can be displayed on the feed machine control.

2 - Busy / Ready to receive – inhibits the feed machine if not clear to 1st hold point.

There is no feed back from the feed machine.

4.2 Cardfolder Sub-Modules

There are 3 functional sub-modules within the Cardfolder – Infeed, Fold 1 & Fold 2. The main drive is by a motor within the Cardfolder, which drives the various constantly running rollers, conveyor and clutch inputs, via various belt & gear drives. There is a slotted disc & sensor, monitoring the main drive. The cardfolder utilises the same PCB as a standard feeder, although has unique firmware at this time.

4.2.1 Infeed - Description

The CF infeed consists of a conveyor amongst which there are 2 sensors, the first being the entry sensor, the second the deskew sensor.

The conveyor is driven direct from the main drive and runs constantly whilst the drive is on.

4.2.2 Infeed - Operation

A document detected at the first sensor will set the machine to start the process. (If the system is in the non-running, "Waiting for Prime" state, then it will run up the drive at this point).

The document will be transferred along the conveyor to block the deskew sensor, and continue to the input rollers of Fold 1 where it will be held for the deskew period, timed from blocking the sensor. This position can also act as a hold point, should there be a hold up upstream.

Whilst a document is on the conveyor, the system will be sending a busy signal to the feed machine, which should inhibit further items being sent.

If all is clear upstream, after the deskew period, the document is ready to enter the Fold 1 sub module.

4.2.3 Fold 1 - Description

The fold1 sub module consists of a pivotable fold plate assembly on which are mounted 2 pairs of feed roller shafts, each with 4 rollers. The upper shaft of each pair is spring loaded against the lower driven shaft. The 2 pairs of rollers are connected by a belt drive and controlled by a wrap-spring clutch/brake arrangement, which takes its drive from the main drive. Also mounted on the fold plate assembly is a sensor pair (FP1).

This assembly is capable of adopting one of 3 positions – Up, Centre & Down and is moved between them by a “Geneva” mechanism driven via a belt drive by either of a pair of wrap-spring clutches, one acting clockwise, the other counter clockwise. There are 3 sensor pairs, mounted on the side plate, to detect the position of the Fold plate assy.

The outfeed from the Fold 1 sub module is via a pair of spring loaded fold rollers, driven direct from the main drive.

4.2.4 Fold 1 - Operation

Depending on the fold type selected, the process would have started with FP1 in one of the 3 positions:

Up – Standard Z fold; V fold with address on reverse side.

Down – C fold; Standard V fold; Bottom address Z fold.

Centre – No fold. (Ignore this for now)

Assuming all is clear up stream, at the end of the Deskew timer, the fold feed roller clutch will energize. The document will advance until the FP1 sensor is blocked, thence continue for a distance according to the selected fold length, then apply brake and disengage clutch.

The fold plate assy will now move to the centre position.

After a short delay, the Fold feed rollers will restart, moving the partially folded document into the nip of the fold rollers, which completes the fold and transfers the document towards the Fold 2 sub module.

If no fold had been selected, the fold plate assy would start in the centre position, with the document being passed straight through. (Whilst this mode is technically possible it is questionable whether it would ever have a practical application!!)

4.2.5 Fold 2 - Description

Fold 2 sub module comprises a rotary folding cassette in which are mounted 2 pairs of feed roller shafts, each with 4 rollers. One shaft of each pair is spring loaded against the other driven shaft. The drive to these rollers is by gears in mesh with a compound pulley/gear, which is driven via a series of 2 belt drives by either of a pair of wrap-spring clutches, one acting clockwise, the other counter clockwise. This compound pulley/gear also carries the armature of a friction clutch that is mounted on the cassette pivot shaft. There is a friction brake mounted at the opposite end of the cassette, which brakes the cassette to the chassis. Outside the brake mounting, there are 2 sensor discs, the inner is 180-degree dark/light, the outer has 2 slots. The inner has 2 slotted disc sensors diametrically opposed, the outer has 1 slotted disc sensor set at 90 degrees.

The single sensor monitors the zero positions, whilst the 2 sensors are used to monitor the rotation and orientation of the cassette.

Mounted on each side of the cassette are 2 semicircular shoes. These have pressure pads bearing on them, 2 positioned on the topside, 2 on the underside.

These arrangements are to grip the document as the cassette rotates, holding it in a consistent position prior to folding.

Each end plate of the cassette assy has a spring-loaded detent acting on it. The plates are profiled such that these detents locate the cassette in a zero position per ½ rotation.

There is a long-range sensor pair mounted around the cassette.

The outfeed from the Fold 1 sub module is via a pair of spring loaded fold rollers, driven direct from the main drive.

4.2.6 Fold 2 - Operation

The friction brake acts to lock the cassette to the chassis.

The friction clutch acts to lock the input drive, and hence the feed rollers, to the cassette.

Therefore, with brake on, and clutch off, the input drive will rotate the fold feed rollers or, with brake off, and clutch on, the input drive will rotate the cassette. (In this mode, the feed rollers are locked to the cassette).

N.b. the cassette has 2 logical positions, referred to as "Up" and "Down", by way of definition, the cassette is in the "Up" position when the gear driven feed rollers are topside, sprung ones underside.

If the selected fold is either V or None, then the cassette only serves to transfer the document through itself to the output fold rollers and on to the Maximailer.

When folding, the cassette can rotate Counter Clockwise or Clockwise depending on fold type:

- CCW – Standard Z fold & C fold.
- CW – Bottom address Z fold.

The cassette will be in the up position at the start of the process. FP1 will outfeed the document towards the cassette. The feed rollers will start, ready to receive it. The document will enter the cassette, pass through the long-range sensor, and continue for a distance according to the selected fold length. The document will be stopped, the cassette will rotate 180 degrees. This point can be used as a hold point in the event of an up stream hold up. If all is clear, after a short delay, the feed rollers will restart, moving the partially folded document into the nip of the fold rollers, which completes the fold and transfers the document out of the cardfolder. The cassette will further rotate 180 degrees ready to receive again.